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Organoleptic Quality of Egg Chips at Various Types and Levels of Fillers

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ABSTRACT

Egg chips are not yet common in society; therefore it is necessary to require attention for consumer assessments. Consumer ratings of egg chips indicate that consumers can accept egg chip products. The study aims to determine the effect of adding the types and levels of filler on the organoleptic quality of egg chips. Eighty-one eggs were used in the research. The studies were arranged based on a completely randomized design with a 3 x 3 factorial pattern with 3 replications. The first factor consisted of 3 types of fillers; there are tapioca powder, soybean protein isolate, and porang powder. The second factor was the level of filler (%) 3, 6, and 9 respectively. The parameters measured were egg chips' organoleptic quality (aroma, color, texture, and fondness). The results data indicated that the types and levels of fillers had a highly significant effect ($P<0.01$) on aroma egg chips. There was an interaction between types and levels of filler on the aroma. There was no significant difference ($P>0.05$) in color, texture, and fondness for egg chips. Adding the type and level of filler material could improve the organoleptic quality of egg chips. The addition of 9% of tapioca powder can increase the aroma of egg chips.
Keywords: Egg powder, egg chips, organoleptic

INTRODUCTION

Egg chips can be made from egg whole that is processed into a solid form [1]. Egg chip is one of diversification of processed egg products in thin, small, and solid plate's form [2]. Egg chips can prevent damage and are expected to increase the selling value of eggs. The panelist's assessment of egg chips resulted that the panelist could accept the egg chips product. Organoleptic assessment is an assessment by panelists using the five senses, to evaluate the success or failure of a product.

Organoleptic quality is one of the key variables of a product because a good organoleptic assessment will increase panelists' interest in a food product. However, the problem is that many consumers do not like products made from processed eggs. Therefore, efforts are needed to improve the quality of egg chips. The addition of tapioca powder, soybean protein isolate, and porang powder is expected to increase the aroma, color, texture, and preference of the panelists toward egg chips.

The use of filler is expected to produce egg chips with good organoleptic assessment. Tapioca powder contains an 17.41% amylose and 82.13% amylopectin [3]. The greater the amylopectin content or the smaller the amylose content of the material used, the more will be sticky the product [3]. Soy protein isolate can bindings water and fat, and has emulsifying properties. Porang powder contains high glucomannan. It is easily soluble in water and easy to stick with other ingredients. Porang powder can be used as a filler and binder in tablets or chips. The addition of the type and level of filler is expected to affect the organoleptic quality (scent, color, texture, and fondness) of egg chips. The research aims to determine the effect of adding polysaccharides filler with different type and level on the organoleptic quality (scent, color, texture, and fondness) of egg chips.

MATERIALS AND METHODS

Research Procedure

The equipment used in this study were measuring cups, plastic containers, mixers, scales, pan drying, blenders, plastic clips, filter paper presses, and chip molds. The material used was eggs, tapioca powder, soybean protein isolate, porang powder, glucose, and alcohol.

Sample Preparation

Eggs obtained from the commercial market. The 30 cleaned eggs, then broken to collect the contents of the eggs. The entire contents of the egg are stirred until well blended, dried in the oven at 50^{o}C for 24 hours. Dried eggs are pounded until smooth like powder. Next, egg chips are made by mixing the fillers: tapioca flour, soy protein isolate, and porang powder and egg powder. The levels (%) of these fillers are: 3, 6, and 9 respectively. Egg chips were prepared using filter paper under pressure of 60 N for 1 minute. These egg chips were then measured for organoleptic in the form of scent, color, texture, and fondness tests.

Measured Parameter

The parameters observed in this study were the organoleptic quality of egg chips. Organoleptic test is a test method using the five human senses as the main tool for measuring the acceptability of a product. The ability of the senses which will be the impression of an assessment of the product being tested is in accordance with the stimuli received by the senses [5]. Organoleptic qualities include aroma, color, texture, and preference. The method used is an assessment score of one to five [6]. The Aroma panel was (1= Very eggy smell 2=Egg smell

3=Slightly eggy scent 4=Slightly eggy smell 5= Not eggy smell). Color assessment was (1= yellowish 2= yellowish white 3= slightly white 4= white 5 = very white). Texture assessment was (1= Very coarse 2= Coarse 3= Fairly smooth 4= Smooth 5= smoothest). Preperence test was (1=dislike very much, 2=dislike 3=somewhat like, 4=like, 5=like very much).

Data Analysis

Organoleptic data were analyzed using analysis of variance based on a completely randomized design (CRD) (3x3) with a factorial pattern. Statistical analysis processed with SPSS Software (Version 16.0)

RESULTS AND DISCUSSIONS

The scent of Egg Chips

Aroma is one of the important sensory properties that can affect the acceptability of food. The results of the study on the aroma of egg chips with the addition of different types and levels of fillers are presented in Table 1.

Table 1. The Scent of Egg Chips with The Addition of Different Types and Levels of Fillers

Fillers	Levels (%)			Average
	3	6	9	
Soybean protein isolate	3.57±0.15	3.83±0.06	3.93±0.12	3.78±0.19^{a}
Tapioca	3.87±0.06	3.83±0.12	4.30±0.00	4.00±0.23^{b}
Porang	3.30±0.10	3.70±0.10	4.27±0.06	3.76±0.43^{a}
Average	3.56±0.26^{x}	3.79±0.11^{y}	4.17±0.19^{z}	

Description: Different superscripts in the same row and column showed a very significant difference (P<0.01). 1= Very eggy smell 2=Egg smell 3=Slightly eggy scent 4=Slightly eggy smell 5= Not eggy smell

The results indicated that the types and levels of filler had a very significant effect (P<0.01) on the aroma of egg chips and there was an interaction between the type and level of the filler. The results of the Least Significance Different (LSD) further test provide the information that the egg chip aroma was significantly different (P<0.01) from the type of filler and increased with the addition of the filler level. The increase in the assessment of aroma by the panelists was due to the addition of more fillers that could reduce the aroma of eggs on egg chips.

Table 1 give result that the panelists' assessment of the aroma value of egg chips was very significantly different in the treatment of the type of filler. This is because the aroma in the type of filler is different [6]. Porang powder has a distinctive fishy scent [7]. Research Study result the crackers treated with a fish: tapioca flour ratio of 20:100 had a slightly musty smell thought to have come from the smell of unripe starch. According to [8] tapioca flour is very suitable for use as a filler because it has odorless characteristics so it is easy to mix with food ingredients. In

addition, due to the distinctive aroma of tapioca powder that comes from the content of degraded starch [9]. Soybean protein isolate gives a distinctive aroma of soybeans (unpleasant) due to the lipoxygenase enzyme in soybeans.

Table 1 also give information that the aroma value of egg chips was very significantly different at the level of filler treatment. This is because the higher the level of addition of the filler material, the less the aroma of the egg will be. A higher filler level can reduce the egg aroma on the egg chip due to the distinctive aroma of each filler. Aroma is a smell that is difficult to measure, so it usually gives rise to different opinions in assessing the quality of the aroma [10]. The differences of opinion because everyone has a different smell, even though they can distinguish the aroma but everyone has a different assessment.

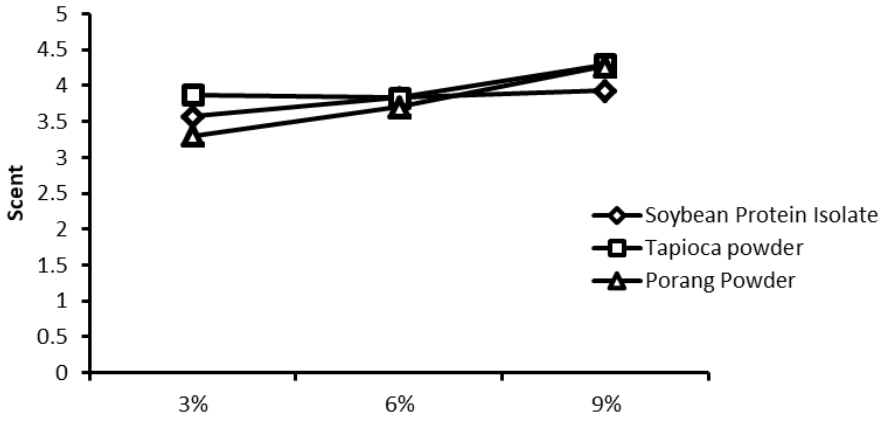

Figure 1. Interaction between type and level of filler on egg chips aroma (1 = Very eggy smell 2=Egg smell 3=Slightly eggy scent 4=Slightly eggy smell 5= Not eggy smell)

Based on the analysis of variance, there was a very significant interaction ($P<0.01$) between the type and level of filler material on the aroma (scent) of egg chips. Figure 1 was showing about the highest aroma value in the treatment of adding tapioca powder filler is 4.00 which means a slightly eggy smell. This indicates that the addition of fillers with different levels can reduce the aroma of eggs of egg chips. Tapioca powder does not have a striking flavor. Porang powder has a distinctive fishy aroma [9]. Soybean protein isolate gives a distinctive aroma of soybeans which is the raw material for soybean protein isolate. The aroma is one of the key variables because a good aroma will increase the panelist's level of preference for a food product.

The Color of Egg Chips

The color is one of the parameters that determine the level of consumer acceptance of egg chips. The results of the study on the color of egg chips with the addition of different types and levels of fillers are presented in Table 2.

Table 2. Color of Egg Chips with The Addition of Different Types and Levels of Filler

Fillers	Levels (%)			Average
	3	6	9	
Soybean protein isolate	2.00±0.10	2.13±0.06	2.20±0.17	2.11±0.14
Tapioca	2.17±0.06	2.10±0.10	2.10±0.17	2.12±0.11
Porang	2.10±0.17	2.10±0.17	1.77±0.58	1.99±0.21
Average	2.09±0.13	2.11±0.11	2.02±0.23	

Description: 1= yellowish 2= yellowish white 3= slightly white 4= white 5= very white

Table 2 shows that the type of filler has no significant effect (P>0.05) on the egg chip color. This shows that the addition of the type of filler does not affect the color of the egg chip. The color of the egg chip produced comes from the color of whole egg powder and the effect of the addition of fillers that have different color characteristics. Soybean protein isolate is yellowish-white with a protein content of not less than 90%. Tapioca powder is white [11] tapioca powder if the manufacturing process is carried out properly, the resulting starch will be pure white. Porang powder has the lowest color, this is because the porang powder is creamy to slightly brownish [6].

Result of egg chip color can be seen in Table 2 that the filler level had no significant effect (P>0.05) on the egg chip color. The average percentage of panelists' assessments of the color of the egg chips produced were 2.09, 2.11, and 2.02, which means yellowish white. The visually color really determines a food is accepted or not by the community or consumers [12]. Even though food has a delicious texture, is nutritious and good, but has an unsightly color, it is not certain that consumers will like it. This is due to the five senses of sight which first play a role in the attraction to food.

The Texture of Egg Chips

Texture is the outer appearance to determine the rough and smooth egg chips. Assessing the texture of a material is one of the elements of food quality that can be felt by touching the fingertips. The results of the study on egg chip texture with the addition of different types and levels of filler are presented in Table 3.

The study results indicated that the type and level of the filler had no significant effect (P>0.05) on the egg chip texture and there was no relationship between the two. Panelists' assessment of egg chips was on average from 4.29 to 4.31 which means it was smooth.

The addition of filler did not differ in the texture of egg chips. The average panelist's assessment of the egg chip texture was smooth (Table 3). This is because the type of filler has a component nutrition that can affect the texture of the egg chips. Soybean protein isolate is suspected to have a positive correlation with differences in protein content of the three types of fillers. Soybean protein isolate protein plays a role in the formation of a compact texture on egg chips. The texture of food is not only affected by water content, fat content, and the amount and type of carbohydrates, but also by the protein that composes it.

Table 3. The Texture of Egg Chips with The Addition of Different Types and Levels of Filler

Fillers	Levels (%)			Average
	3	6	9	
Soybean protein isolate	4.28±0.10	4.31±0.04	4.35±0.06	4.31±0.06
Tapioca	4.30±0.10	4.28±0.08	4.31±0.14	4.30±0.09
Porang	4.33±0.06	4.28±0.08	4.27±0.06	4.29±0.06
Average	4.30±0.08	4.29±0.06	4.31±0.09	

Description: 1= Very coarse 2= Coarse 3= Somewhat fine 4= Fine 5= Very fine

Tapioca flour is easy to stick to other ingredients, when mixed with other ingredients it produces egg chips with a compact and smooth texture. Tapioca flour contains amylose which produces a texture that is valued higher in cohesiveness [13]. Straight or open amylose chains have a larger surface area. This allows it to absorb more or bind water and binding properties. These properties possessed by tapioca flour can reduce the brittleness so that the texture is smoother.

The texture value of egg chips can be seen in table 3, which is not different at the filler level treatment. The texture of egg chips can also be affected by the hardness of the chips. The hardness of the resulting egg chips is relatively low which results in a smooth texture. The higher the hardness value of a product gives an indication that the product has a relatively hard/coarse texture and is less crunchy than products with a low hardness value. The texture of expanded snacks was determined by amount of soft and hard fillers. The absence of any filler or the presence of many hard fillers lead to a snack with a hard, coarse and non-crispy texture. However, if a significant number of soft fillers is used then one attains a fine, and crispy texture. [14]. In addition, what can affect the texture of food products is the filler content. The high amylose starch content tends to increase retrogradation. Amylose molecules bind to each other and will bind to amylopectin branches on the outside of the granules, causing changes in texture, where retrogradation by amylose produces a strong structure due to increased firmness.

Food texture has an important role in the food processing process. This texture is closely related to the water content of the food. The higher the water content contained in a food ingredient, the softer the texture will be, and vice versa if there is a lack of water in a food ingredient, the texture will become brittle or break easily [15].

The Fondness of Egg Chips

The fondness egg chips in general can be judged based on fondness for aroma, color, and texture. The results of the study on the fondness for egg chips with the addition of different types and levels of fillers are presented in Table 4.

The results display data about the type and level of filler had no significant effect (P>0.05) on the preference for egg chips and there was no interaction between the type and level of the filler. Panelists' assessment tends to like egg chips with the addition of fillers (Table 4).

Table 4. Favorite of Egg Chips with The Addition of Different Types and Levels of Filler

Types of Fillers	Filler Levels (%)			Average
	3	6	9	
Soybean protein isolate	3.83±0.12	3.87±0.15	3.77±0.06	3.82±0.11
Tapioca	3.73±0.06	3.97±0.15	3.83±0.06	3.84±0.13
Porang	3.73±0.12	3.70±0.10	3.73±0.06	3.72±0.08
Average	3.77±0.10	3.84±0.17	3.78±0.07	

Description: 1= Dislike very much, 2= Dislike 3= Slightly like, 4= Like, 5= like very much

The fondness value for egg chips was not significantly different from the preference for egg chips. The panelist's assessment of the preference for the egg chip showed that the panelist could accept and like the egg chip. Likes are the final assessment of the panelists and are the key to whether a product is accepted or not [16]. One way of knowing consumer desires for food and beverage products can be done with a preference test. This is a sign that this product is good enough to be developed for commercial purposes in the future.

The filler level was not significantly different (P>0.05) with respect to egg chip preferences. The average percentage of panelists' scores on the preference of the egg chips produced was 3.77, 3.84, and 3.78 which means they like it. The panelists' preference for the egg chips produced is like. The more fillers added to the egg chip, the more panelists tend to like it. Panelists' assessment of this preference was influenced by an assessment of the color, aroma, and texture of the egg chip as a whole. The egg chips have a yellowish-white color, a slightly egg-like aroma, and a smooth texture. The panelist test for a food greatly determines whether a product can become a product that can be commercialized or is successful for development in product down streaming [17, 18]. The acceptance approach and panelist test are the most popular testing approaches without the use of laboratory equipment [19]

CONCLUSIONS

The results showed that the addition of the type and level of filler material could improve the organoleptic quality of egg chips. The addition of tapioca powder at a level of 9% can increase the scent of egg chips. The egg chips have a yellowish white color, a slightly egg-like aroma, and a smooth texture.

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