

DEVELOPMENT OF SUSHI JALI - JALI WITH SUBSTITUTIONS RAW MATERIALS JALI-JALI SEEDS (*Coix Lacryma-Jobi*)

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ABSTRACT

This study aims to develop a sushi product recipes with the substitution jali seeds seed, to determine the value of the product received from the public by hedonic test and to determine the content of the nutritional value of the product substitution sushi with jali seeds seeds. This type of research is the R & D or research and development with the aim to find and develop products. Development model is carried by 4D (Define, Design, Development, and Dissemination). In this development model testing at each stage. Tests carried out by two people trained panelists, 30 panelists semi-trained and 60 untrained panelists. Results showed recipes 3 with substitution of jali seeds 100% get highest rates compared to recipe 1 and 2. Received power product development sushi jali seeds are in like and very like assessment. The assessment is done by untrained panelists of 60 people with an average score of between 3.4 up to 3.6 for all the assessment indicators. Based on the calculation of nutritional adequacy rate sushi jali seeds 100 grams is 1% fat, 5% protein and 7% carbohydrate.

Keywords: sushi, jali seeds, R & D

INTRODUCTION

Rice is the staple food for the majority of the population in Indonesia. But until now, Indonesia has not been able to meet demand for rice for the population in Indonesia, so the government had to import rice from other countries. Therefore, the Indonesian government was proclaimed their food security in Indonesia. In realizing this, the government as policy makers set the regulation No.22 of 2009 on the policy of accelerated diversification of consumption to food based on local resources.

In this case the one effort that can be done to succeed it is the presence of food diversification. Food diversification is an election process food not only depend on one type of food, but has a variety of choices (alternative) to a variety of foodstuffs (Riyadi: 2003). Food diversification efforts in Indonesia can be done with a variety of potential food sources of alternative (non-rice). Potential alternative source of food-producing carbohydrates include: sorghum, millet (millet), potatoes, and hanjeli or jali seeds (Nurmala: 2011).

Hanjeli or jali seeds (*Coix Lacryma-Jobi*) is a cereal that comes from the East Asia and Malaya, but the distribution has been expanded to Southeast Asia. Hanjeli plant deployment in Indonesia

evenly from Sumatra, Java and Kalimantan (Faesal: 2013). The carbohydrate content in hanjeli almost the same carbohydrate content in rice from the rice. Additionally fat protein, and vitamin B1 in hanjeli much higher than other seralia plant (Qasim and Nurmala: 2011). In 100 grams of hanjeli containing 9.1 to 23.0 grams of protein and 0.3 to 8.4 grams of fiber (Rick Burnette (2012) in Astarina Ditta (2015)). However, the use of hanjeli as a food product at the moment is still very low, usually people only processing into pulp, steamed, soups, mixed drinks or sweet foods. The monoton of processing jali seeds makes hanjeli increasingly rare on the market and probably a lot of people who already do not recognize the food material. So, we need innovative food products with other variations that are also favored by the public, as well as products Sushi.

Sushi is vinegared rice with something on top (Tane) or inside (gu) The main principle in any modern form of Sushi is a combination of cooked vinegared rice is good with something to put on top (Tane, neta) or with stuffing (gu) (G. Mouritsen (2009: 19)). Lauk (neta) in the form of raw sea fish so that in addition to the carbohydrate content of rice, Sushi also contains protein derived from marine fish raw. But along with the development of the

times and follow the market demand in Indonesia is less like raw sea fish consumption, then diubahlah dishes at Sushi with different variants of stuffing when compared to the lower protein content of raw sea fish.

This is an opportunity for hanjeli which has a protein content of $9.1 = 23.0$ g at 100 grams. So as to increase the protein content in sushi does not use raw sea fish. Additionally jali seeds seeds can be food in food diversification efforts in Indonesia, namely the development of products and foodstuffs Sushi jali seeds seeds with the substitution technique.

In substitution jali seeds research on Sushi, will be the development of recipes, test trained sensory panelists, panelists A test of semi-trained and untrained panelists, determining the selling price and the nutritional analysis contained in Sushi jali seeds.

METHOD

Types of research

This type of research on product development Sushi jali seeds is R & D (research and development) with the 4D development model (Define, Design, Development, and Dissemination). Research and development is defined as a type of research that aims to seek, find, fix, develop, and produce, test the product, until it produces a product that is standardized according to the indicators set. In this type of research R & D research can be more effective and adaptable in addition to more in-depth research and more applicable.

Development model

4D development model; Define, Design, Development, and Dissemination developed by Thiagarajan (1974). According to Endang Mulyatingsih (2016) it is the activities performed at each stage of development can be explained as follows:

a. Define

Activities undertaken to establish and define the terms of development. Activity analysis of development needs, the terms of the development of products that fit the needs of the user. The analysis can be

done through the study of literature or the preliminary study.

b. Design

At the design stage, the researchers have already made the initial product (prototype) or product design. Prior to the design of the product proceed to the next stage, the design of these products need to be validated. Validation of product design is done by trained panelists.

c. Development

Thiagarajan split in two development stage activities, namely: expert appraisal and developmental testing. Expert appraisal is a technique to validate or assess the feasibility of the design of the product. Developmental testing is testing the product design activity in the subject real target. At the time of this trial sought response data, reaction or comment from the target consumers of the product. The trial results are used to improve the product, after the product repaired and then tested back to obtain effective results and diterbaik.

d. Disseminate

In the validation phase of testing, the product which has been revised during the development stage and then implemented on the real target. This is done to see the results of the achievement of objectives.

Raw material

This study developed a product with the use of jali seeds instead of rice products Sushi Jali-jali. Materials in the manufacture Sushi jali seeds are seeds of jali were obtained from the mini market Vegan in the city of Tangerang, nori "Daesang Laver Gimhap" rice vinegar "Narcissus", powdered agar plain "Swallow", sugar, crabstick bulk, carrots, cucumbers, domestic chicken eggs, purple cabbage and cucumber were obtained from a local supermarket "Mirota Kampus".

Sensory test

Sensory test conducted in this study is to test the hedonic or hedonic test. This test will show consumer reactions or panelists can be love or not in the nature of the material or product, or provide an assessment of rank / order like whether or not in the nature of a material or product Panelists used preferably in large quantities

that represent specific populations. (Nani Ratnaningsih, 2010: 02)

Tested grading scale is a scale of 1 to 4. Scale 1 = strongly dislike, scale 2 = dislike, scale 3 = like, and scale 4 = very like. The scale for each parameter sensory functions that include color, aroma, flavor, texture and overall nature of product development assessed by the panelists.

Panelists trained panelists composed by 2 people who are lecturers cookery, semi-trained panel of 30 people from culinary students and untrained panelists were 60 people who came from visitors to the exhibition.

Nutritional analysis

a. Analysis of water content

The principle of the determination of water content by drying / thermogravimetry is the evaporation of water in the material by way of heating. Then do the weighing of the material to constant weight indicating that

$$\text{Kadar air basis basah (g/100 g bahan basah)} = \frac{W-(W1-W2)}{W} \times 100$$

$$\text{Kadar air basis kering (g/100 g bahan kering)} = \frac{W-(W1-W2)}{W1-W2} \times 100$$

all the water contained in the material has been vaporized all.

Information :

W = weight of the sample before drying (g)

W1 = bobor samples and dry cup (gr)

W2 = weight of the empty cup (gr)

b. Analysis of ash content

The principle of determining the ash content is by conditioning all organic substances at a high temperature, which is about 500-600°C, then left the burning substance weighed. The samples will be weighed diabukan certain amount depending on the kind of material.

$$\text{Kadar abu (\%)} = \frac{\text{Berat abu (gr)}}{\text{Berat sampel (gr)}} \times 100 \%$$

Information :

Heavy ash = weight of dish and sample after drying - weight of empty cup

Sample weight = weight of dish and sample before drying - weight of empty cup

c. Analysis of lipid levels

This method uses a solvent extraction

$$\% \text{ lemak} = \frac{w3-w2}{w1} \times 100 \%$$

with semikontinu that meet ekstraksi space for 5 to 10 minutes. The fat content is

measured by the weight lost from the sample.

W1 = weight of sample (g)

W2 = weight of fat empty flask (g)

W3 = weight of fat pumpkin + fat extraction yield (g)

d. Analysis of protein content

This method consists of heating the substance with sulfuric acid which break down organic matter to oxidation is reduced to free nitrogen such as ammonium sulfate. In this step potassium sulfate added to increase Boiling tidik medium (from 337 ° C to 373 ° C).

e. Analysis karbohidrat levels

Method by difference in Weende proximate analysis system is to reduce the water content, protein content, fat content and ash content of the total food tested.

$$\% N = \frac{\text{ml HCl (sampel - blanko)}}{\text{berat sampel (g)} \times 1000} \times N \text{ HCl} \times 14,008 \times 100\%$$

Data analysis

In this study, the method of analysis used is quantitative analysis techniques. The analytical techniques can be either an explanation or quantitative descriptive. In addition the data obtained were also analyzed with the following stages:

1. At the design stage and define quantitatively analyzed descriptively,
2. In the development phase were analyzed by t-test a limited scale with p value of 0.05 to test for differences in the samples (control and development).

RESULTS AND DISCUSSION

On stage *design* has determined a recipe sushi recipes as a reference or control to be used for recipe development.

Table 1. Recipe control and recipe development

Material names, units	Control	recipe 1	recipes 2	recipe 3
Fluffier rice, gr	100	60	80	100
Jali seeds , gr	0	40	20	0
Powdered gelatin, tbs	1	1	1	1
Simple syrup,	1	1	1	1

tablespoon				
Rice	1½	1½	1½	1½
vinegar,				
tablespoon				
Nori, the	1	1	1	1
LBR				
Water, ml	200	200	200	200
Boiled	30	30	30	30
carrots, gr				
Purple	15	15	15	15
cabbage, gr				
Crabstick, gr	20	20	20	20
Omelet, gr	15	15	15	15
Cucumbers,	30	30	30	30
gr				

In making sushi jali seeds must do some special treatment on jali seeds grains, it by soaking jali seeds for 24 hours in clean water with the aim of eliminating the musty odor and soften the texture of jali seeds order to speed up the ripening process.

The first sensory test carried out by trained panelists as much as 1 to determine one recipe development. Recipe 3 shows better results than the recipe 1 and recipe 2 with average ratings of 3.4. So that the development of products using prescription 3 sushi substitution with jali seeds 100%.

Table 2. Results of the sensory test define phase

	Control	recipe 1	recipes 2	recipe 3
Color	4	3	3	3
aroma	4	4	4	4
Texture	4	1	2	3
flavor	4	4	4	4
Whole	4	2	2	3
Average	4	2.8	3	3.4

3 recipe development were made to make the product can resemble the controls based on table 2 shows that the assessment is still lacking color and texture in accordance with the controls. Phase validation is performed by trained panelists sensory test by 1 person.

Table 3. Results of the sensory test validation phase

	Control		Development	
	P1	P2	P1	P2
Color	4	4	4	4
aroma	4	4	4	4
Texture	3	4	4	4
flavor	3	3	4	4
Whole	3	3	4	4
Average	3.5		4	

Table 3 at the stage of validation shows that product development has a higher value than the control. The total average of the panelists trained 1 and 2 for the control was 3.5 and for product development is 4. Therefore, the products are accepted for continued development of the hedonic test on a semi-trained panelists.

Hedonic test carried out by semi-trained panel of 30 people from education student culinary techniques. The hedonic test performed on the data to test T analisis limited scale with the results for the color value of P value: 0.39, aroma: 0.30, textures: 0.42, flavors: 0.18, and overall: 0.10. All indicators have a value of P values greater than 0.05, then the product development and control were not significantly different.

Table 4. Results of semi-trained panelists hedonic test

	Control	Development	P Value
Color	3.40	3.40	0.39
aroma	3.10	3.00	0.30
Texture	3.30	3.26	0.42
flavor	3.03	2.68	0.18
Whole	3.26	3.06	0.10

Hedonic test untrained panelists of 60 people by the end of the project exhibition visitors culinary faculty of engineering, UNY. Panelists rate the product development shusi jali seeds without control products to the rating scale of 1 to 4. Obtained mean score for color values: 3.5, aroma: 3.4, texture: 3.5, flavor: 3.5, and the overall 3.6. These results showed the average ratings on a scale of joy and love, which means people like the product shusi jali seeds. So the sushi jali seeds products can be produced commercially to be marketed to the public.

Table 5. Results of hedonic test untrained panelists

	The score
Color	3.5
Aroma	3.4
Texture	3.5
Flavor	3.5
Whole	3.6

Jali seeds sushi product can be marketed to the community as a result of food diversification. Based on the calculation of the sale price obtained selling

price sushi jali seeds per serving (150gr) for Rp. 17500.00. The selling price includes the gain as much as 30% and other expenditure requirements (overhead) as much as 15%.

On the nutritional analysis that has been done by testing Proximate to the 100 g sample sushi jali seeds content of the indicator is obtained as much as 74.05% water, minerals as much as 0.31%, fats as much as 0.83%, 3.03% total protein, and carbohydrates as much as 21.75%.

Table 6. The test results of proximate 100 g sushi jali seeds

	Content analysis
Water	74.08%
Mineral	0.31%
Fat	0.83%
protein	3.03%
Carbohydrate	21.75%

With the results of nutritional analysis, it can be converted into a nutrition label with reference to the attachment head of POM RI no. HK.00.05.52.6291 on nutritional labeling reference food products. Calculation of nutritional adequacy rate for nutritional labeling is done with reference to the nutritional value of common consumer groups. Table 7 shows the results of calculation of nutritional adequacy rate at the sushi product jali seeds.

Table 7. Results of arithmetic AKG%

	AKG%
Fat	1%
protein	5%
Carbohydrate	7%

CONCLUSION

Recipe 3 made recipe development with the percentage of jali seeds seeds as much as 100gr. Soaking seeds of jali seeds for 24 hours to do as a form of special treatment to reduce the musty smell and soften the texture of jali seeds seeds in order to simplify as pemasakkan. In the validation phase, the panelists give a higher value to the product development of the indicator texture.

The next test is the hedonic test with 30 semi-trained panelists. Hedonic test results between the control sample and the development has a P value of more than 0.05 in all indicators. It signifies proficiency level

on the two samples were not significantly different. Hedonic test on 60 untrained panelists showed good results. The mean score on all indicators is between 3.4 to 3.6. The score is on a scale of 3 and 4 with captions like and love.

Hedonic test results on untrained panelists excuse sushi commercial production of jali seeds in the community. Calculation of selling prices for sushi jali seeds per serving (150gr) is Rp17.500,00. Jaul price includes gains of 30% and overhead costs as much as 15%.

Nutritional analysis conducted showed higher levels in the water analysis *sushi* jali seeds, as much as 74.08%, 0.31% minerals, fat, 0.83%, 3.03% protein, and carbohydrates 21.75%. Based on the attachment head of POM RI no. HK.00.05.52.6291 on nutritional labeling reference food products, nutritional adequacy rate calculation results *sushi* jali seeds is 1% fat, 5% protein and 7% of carbohydrates per 100 grams.

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