

BLACK CHOIPAN BASED ON BLACK RICE FLOUR AS AN ALTERNATIVE SNACK FOR DIABETES MELLITUS

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ABSTRACT

Changes in lifestyle that occur today, affect eating habits which is not good. Poor eating habits can cause many kinds of degenerative diseases, one of which is diabetes mellitus. One strategy to control blood glucose levels is to regulate a healthy diet. The purpose of this research are: 1) to innovating traditional snack products that are suitable for people with diabetes mellitus who can be accepted and favored by the public in the making of Black Choi Pan based on black rice flour; 2) to know the nutritional value contained in Black Choi Pan products; 3) to know the level of acceptance of Black Choi Pan products. In this study using R & D experiments with a series of 4D steps (*Determine, Design, Develop, Disseminate*). The conclusion of this study are: 1) The Black Choi Pan product is better or close to the reference product; 2) Black Choi Pan products are very favored with the public; 3) Black Choi Pan products can be accepted by the public and become an alternative snack for people with diabetes mellitus.

Key Words: black rice flour, snacks, functional food, diabetes mellitus, healthy snacks.

INTRODUCTION

Changes in lifestyles that occur today, affect poor eating habits. The selection of types of food and poor food consumption patterns of society has an impact on increasing various kinds of degenerative diseases, including: diabetes mellitus, cancer, hypertension, and heart attack.

Diabetes mellitus (DM) is a metabolic disorder that affects the metabolism of carbohydrates, fats and proteins. The number of DM patients in the world has increased from year to year. According to International Federation Diabetes, in 2012 there were 382 million adults in the worldwide or 8.3% having diabetes. 80% of them live in low and middle income countries. The number of people with DM is increasing rapidly throughout the world and this disease has become a global epidemic disease (Sinaga and Wirawanni 2012). Indonesia is ranked in the top ten as the country with the highest diabetics in the world, DM patients in Indonesia are increasing, where 90% -95% are DM type 2. (Wild et al 2004) estimates that in 2030 the number of DM patients in Indonesia will reach 21.3 million.

Blood glucose level control can be done through non-pharmacological therapy or

pharmacological therapy. Research shows that non-pharmacological therapy through dietary regulation is effective in controlling blood glucose levels, lipid profiles, and blood pressure in patients with DM type 2. Strategies in regulating diet can be done to help control blood glucose levels, one of which is by consuming foods with a low glycemic index (GI). Research shows that low-GI foods can improve insulin sensitivity and reduce the rate of absorption of glucose, so it is useful in controlling blood glucose for people with DM.

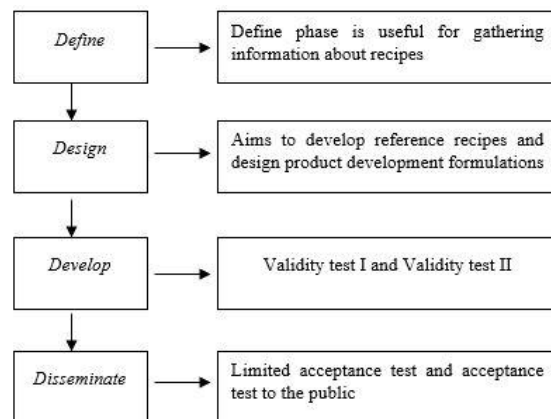
Rice is a food source of energy that has a high carbohydrate content but low protein. Rice has a biological value of protein 56, this value is higher than other cereals, but still low when compared to animal protein sources. White rice is a staple food for most people in Indonesia. One food that can be used as a substitute for white rice is black rice. Black rice has a lower glycemic index than white rice. Black rice glycemic index is 42.3. One of the contributing factors is the high content of black rice fiber. (Widiwati Ayu 2017). But in practice the use of black rice is still rarely used by the society, especially its use as an alternative food ingredient for people with diabetes mellitus.

Snack groups develop and are made traditionally. Snacks that are often found in the market are not uncommon based on white rice flour for example such as: nagasari, layer cake, cucur cake, mangkok cake, marrow porridge, Choi Pan and many more.

Choi Pan is an Indonesian snack originating from Pontianak and is one snack made from white rice flour. White rice flour is one type of ingredient that is not suitable for people with diabetes mellitus. To provide a solution to one of these problems, the making of this Food Product Innovation study aims to create products that are good for consumption for people with Diabetes Mellitus by substituting the basic ingredients of white rice flour with black rice flour. this study aims to innovate snacks from Pontianak, namely Choi Pan by using black rice flour as an alternative to healthy foods that have a low glycemic index and can be accepted by the public.

METHOD

The research method in this study is to use Research and Development research methodology. Development Research or Research and Development (R & D) is often interpreted as a process or steps to develop a new product or perfect an existing product. Sugiyono (2009: 297) said that Research and Development is a research method used to produce certain products, and test the effectiveness of the method. In order to achieve goals and produce products as expected, there needs to be a documented and measurable stage of activity at all stages of development. (Endang Mulyatiningsih). Through a series of 4D steps, namely: *Define*, *Design*, *Develop*, and *Disseminate*.



Pict 1. Metodology Flow Chart

In this study using a method of data analysis carried out descriptively. Descriptive data analysis technique is an analysis of techniques used to analyze data by describing or analyzing data that has been collected as a minimum without any intention of making generalizations from the results of the study.

In this study, we used several panelists as data sources. Panelists assess the texture, color, taste, aroma and preference of Black Choi Pan. The data sources are presented in table 1.

Table 1. Data Sources

Research Step	Data Sources	Total
Validity I	Expert	2
Validity II	Expert	2
Limited acceptance test	Panelist	30
Disseminate	The visitors	60

RESULT

Choi Pan is a traditional snack from Pontianak that has been made so far using white rice flour. Consumption of white rice flour is not recommended for people with diabetes mellitus.

Black Choi Pan based on black rice flour is an alternative or breakthrough new product that can replace the basic ingredients of white rice flour. This product is created because there are at least snack products that use functional food that have good potential for health. This product innovation is made to be used as an alternative healthy food suitable for people with diabetes mellitus even for healthy people even because of the content of black rice flour which is rich in fiber.

In this study a new breakthrough for the product development will be developed, namely Black Choi Pan which is made from black rice flour. This product refers to the Choi Pan product from the recipe for Ayudiah Respatih in the 2018 Snack It Up Book.

Define

At this stage the practitioner collected three recipes from sources of books and magazines. The three recipes were then analyzed and tested to obtain a reference recipe that will be used as a control of the product to be made using black rice flour.

Table 2. Formulasi Control Product

Ingredients	F1	F2	F3
White rice flour	200 gr	180 gr	100 gr
Sago flour	60 gr	-	20 gr
Starch flour	-	25 gr	-
Vegetable oil	90 ml	45 ml	45 ml
Water	500 ml	450 ml	125 ml
Salt	-	2 gr	2 gr

Notes:

F1 = *Snack It Up*, Ayudiah Respatih, 2018.

F2 = *Resep Jajanan Pasar Favorit*, Tim Ide Masak, 2011.

F3 = *E-Magazine Femina*, 25 May 2015.

Based on trials and sensory tests of the three prescriptions that have been made, so that the selected reference recipe is obtained, namely one reference formula (F1) written by Ayudiah Respatih in the 2018 Snack It Up book.

Design

In the define phase, one reference recipe will be developed in the design phase. Products that are used as a reference will be developed using black rice flour. At this stage the practitioner will make three product development formulas in determining how much material can replace the reference product material.

Table 3. Developed Product Formula

Ingredient	Control Recipe	F1 (50%)	F2 (75%)	F3 (100%)
White rice flour	200 gr	100 gr	50 gr	-
Black rice flour	-	100 gr	150 gr	200 gr
Sago flour	60 gr	60 gr	60 gr	60 gr
Vegetable oil	90 ml	90 ml	90 ml	90 ml
water	500 ml	500 ml	500 ml	500 ml

Develop

In the development phase of product development, the practitioner determines the variations in the filling and sauce to be used. In this step the practitioner determines the reference prescription for the filling and sauce used in the reference product and determines the recipe for the filling and sauce used in the product development.

After determining the development of variations in the fields, the practitioner carries out the Validation Test I. The technique of presenting one development product and one

reference product simultaneously with two experts. If the Validation Test I results are feasible, then the development product is continued for proximate testing in the Laboratory. If still need repairs, then the Validation Test II is carried out. Presentation techniques on one development product and one reference product simultaneously with two experts so that the selected development product presentation techniques are obtained and continued for proximate testing in the laboratory.

Table 4. References filling and sauces recipe

Ingredients	Filling	Sauce
Fresh Chilli	-	20 gr
Water	-	100 ml
Garlic	5 gr	10 gr
Sugar	-	10 gr
Lime	-	10 ml
Salt	3 gr	2 gr
Baby Prawn	25 gr	
Yam Bean	250 gr	
Pepper	3 gr	
Vegetable Oil	45 ml	

Table 5. Development filling and sauce recipe

Ingredients	Filling	Sauce
Heavy Cream	-	30 ml
Butter	30 gr	10 gr
Flour	-	10 gr
Fresh Milk	-	250 ml
Cheddar Cheese	-	30 gr
Salt	5 gr	2 gr
Pepper	5 gr	2 gr
Whole Egg	-	60 gr
Oregano	-	2 gr
Onion	20 gr	20 gr
Garlic	-	5 gr
Ground Chicken	100 gr	
Boiled Spinach	50 gr	

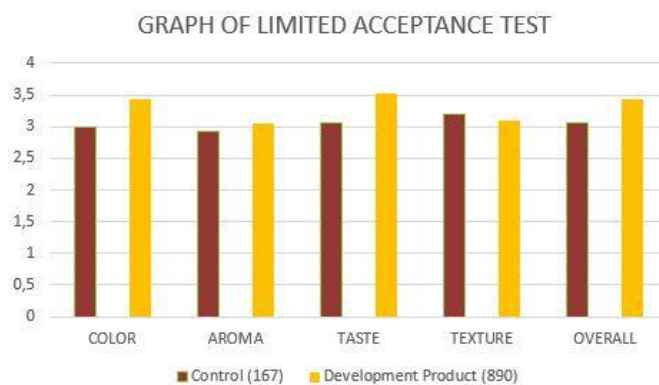
Disseminate

At the disseminate stage there are 3 activities, namely validation testing, packaging, diffusion and adaption. Products that have been

developed are implemented into actual conditions. The next activity is to conduct a limited acceptance test by testing the reference products and development products from sensory characteristics to a minimum of 30 panelists. The last activity is packaging products so that products can be disseminated to many people through acceptance tests to the community by carrying out exhibitions that will be visited by at least 60 people.

DISCUSSION

At the Disseminate stage the practitioner gets limited acceptance test results and tests the level of liked for the panelists. The limited acceptance test is carried out by testing the reference products with sample code 167 and development products with sample code 890. Test this to find out whether product development is feasible and better or more concerned with reference products. In this evaluation, the practitioner obtained data of 30 forms for reference products (167) and 30 forms of product development (890). Like the graph of data obtained as follows:

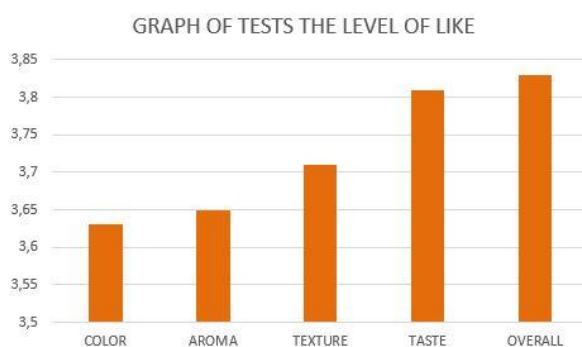


Pict 2. Graph for form result

Based on the panelists limited graphs of acceptance test forms, it can be seen that the aroma of the reference product (167) has the lowest average of 2.93 and the highest score is in the texture with a value of 3.2. Followed by a color score of 3.00 and a taste of 3.06. Overall the reference product 167 obtains a score of 3.06 for which the reference product 167 is favored by the panelist.

Then, in the product development graph (890) it can be seen that the aroma has the lowest average score of 3.06 but this score is better than the reference product (167) which only gets 2.93. The highest average value in product development (890) was found in the taste with a score of 3.53. Followed by a color score of 3.43 and a texture of 3.1. Overall product development (890) obtained a score of 3.43 which results from product development (890) favored by panelists.

After the acceptance limited test, the next is tests the level of like for public. This test aims to determine whether the development product is liked and can be accepted by the wider community. In this test, the practitioner obtained data as many as 60 forms. The graph of the data obtained is as follows:



Pict 3. Graph Form Result

Based on the results of the graph of the favorite level test form by the community, it can be seen that the color of the development product has the lowest score of 3.63. Whereas for the highest score there is a feeling that is equal to 3.81. Followed by a scent of 3.65 and a texture of 3.7. Overall the product development score is 3.83 where the result is that the product development is very favored by the panelists.

The last step in this research is the Proximate Analysis Test stage. Mulyono (2000), states that proximate analysis is the analysis or chemical testing carried out for raw materials that will be processed further in the industry into finished goods. Proximate analysis has benefits as an assessment of the quality of feed or food, especially in the standard of food

that should be contained in it. In macronutrient content, proximate analysis includes total ash content, total water, total fat, total protein and total carbohydrate, while for micronutrient content is focused on provitamin A (β -carotene) (Sudarmadji et al., 1996).

The following are the results of the proximate analysis contained in the 100g Black Choi Pan.

Table 6. Proximate Analysis Test

Analysis	Stage 1 (%)	Stage 2 (%)	Average (%)
Water	45,90	45,35	45,62
Ash	1,76	1,45	1,60
Protein	13,49	13,74	13,61
Fat	11,55	11,60	11,57
Fiber	4,76	4,57	4,66
Carbohydrates	22,51	23,27	22,89
Energy(kal/100g)	248,89	253,27	251,08

Notes: Proximate analysis tests were carried out at the Pratama Chem-Mix Laboratory in Yogyakarta.

Based on the results of the proximate analysis test in table 6 testing was done twice. Then the results of both are averaged and a water content of 45.62% is obtained; 1.60% ash; protein 13.61%; fat 11.57%; fiber 4.66%; carbohydrates 22.89%; energy 251.08 kal / 100g.

CONCLUSION

Based on the results of observations, analyzes, and research that the practitioner does, it can be concluded that the product of the Black Choi Pan development is better or close to the reference product. This is based on the results of graph analysis, the limited acceptance test. In test the level of like obtained by the product development was very favored by untrained panelists with an overall score of 3.83. This is based on the results of the graph analysis of test the level of like forms. In the last stage, namely the proximate analysis test obtained an average water content of 45.62%; 1.60% ash; protein 13.61%; fat 11.57%; fiber 4.66%; carbohydrates 22.89%; energy 251.08 kal / 100g. So in this study Black Choi pan

products can be received by the public and become one of the snack alternatives for people with diabetes mellitus, which of course still has to be helped with the intake of other nutritious and fiber-rich foods.

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