Acceptance and Analysis of Protein and Carbon Content in Quinoa Flour Substituted Cookies and Dragon Fruit Flour

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ABSTRACT

Cookies are referred to as pastries in Indonesia which are processed with various shapes and flavors. Cookies are generally made from flour which is known to have a high carbohydrate content but low protein content so that it can cause obesity if consumed in excess. The purpose of this study was to determine the acceptability, protein and carbohydrate content of cookies with the substitution of quinoa flour and dragon fruit peel flour. The type of research was one shot group research design. Acceptance was carried out in the organoleptic laboratory of the Department of Nutrition, Health Polytechnic of Makassar and assessed based on the hedonic test. Protein content in cookies using a laboratory test using the Micro Kjedhall method and carbohydrate content using a percentage laboratory test. The results of the research on the acceptance of the preferred color aspect are cookies with a concentration of F1 and F2, the aroma aspect with a concentration of F1 and texture with a concentration of F2, the preferred taste aspect in cookies with a concentration of F1 and the most preferred is F2. F1 concentration The highest protein content was 12.36% and F3 concentration the highest carbohydrate content was 59.58%. The best concentration is cookies with a concentration of F2 and a high protein content in cookies with a concentration of F1 as much as 12.36% and a high carbohydrate value, which is 59.58% in cookies with a concentration of F3.

Keywords: *Cookies, Carbohydrates, Protein, Quinoa Flour, Dragon Fruit Skin Flour.*

INTRODUCTION

Cookies referred to as pastries in Indonesia which are processed with various shapes and flavors are also quite popular among the people (Oktaviana et al, 2017). Cookies are usually used as snacks or snacks after the main food among teenagers, cookies become food consumed with tea or other beverages. Cookies are generally made from flour which is the result of processed wheat seeds which are known to have high carbohydrate content but low protein content so that they can cause obesity if consumed in excess (Nurcahyani, 2016).

Adolescents are children whose age has entered the age of 10-18 years in the form of a transition period from children to adulthood. Adolescence is a period that is vulnerable to excess nutrients because at this time adolescents have a high level of food consumption patterns. According to Riskesdas in 2018, obesity at the age of > 15 years was 31.0% in Indonesia, an increase of 4.4% from 2013 while in Sulawesi itself it was 33% (Ministry of Health RI Agency for Research and Development, 2018).

Obesity is a non-communicable disease caused by the accumulation of fat in the body and can increase the risk of health problems. Obesity can occur due to the pattern of consumption of excess calories compared to the expenditure so that body weight is above the ideal normal value. According to research (Hendra et al., 2016) in the city of Bitung there are 5 factors that influence obesity, the most important of which are diet, heredity, lifestyle factors, environmental factors and physical activity, and psychological/stress factors.

Protein or from Greek means proteos which means very important or the main thing

is a giant biomolecule other than lipids, polysaccharides, and polynucleotides with large molecular weights consisting of one or more amino acids. In the body there are 100,000 types of protein. The content in protein is carbon, hydrogen, oxygen, nitrogen, and sometimes phosphorus and sulfur (Paramashanti, 2019).

Protein is a compound that is present in the body by 20% of the total weight of humans and almost half is stored in the muscles. Protein is the most important source of food substances in the body after water because protein is a source of energy in addition to carbohydrates and fats, protein is also a building block, regulating and forming new tissues. Protein containing nitrogen is believed to be a factor to carry out functions in the body (Fitri & Wiji, 2019).

Protein has 2 sources that are easily available in the community. Sources of animal protein that has the largest protein sources such as eggs, milk, meat, poultry, fish. And kerrang. The second source is a source of vegetable protein that has high biological value and quality, such as nuts, tempeh, tofu.

Carbohydrates are part of the macronutrients and the most important source of energy needed by the human body and provide 4 calories of energy/gr. Carbohydrates are composed of the elements Carbon (C), Hydrogen (H), and Oxygen (O). Carbohydrates are important substances for humans because their molecules provide the element carbon in every cell. Carbohydrates that are not used will be stored in the form of glycogen as ready-to-use energy if the body experiences a deficiency.

The main structure of carbohydrates is monosaccharides which are the simplest form of carbohydrates. Monosaccharide comes from the Greek words mono (one) and sacchar (sugar). Monosaccharides consist of glucose, galactose, fructose, mannose, and others. Carbohydrates are very important for the human body because they can support the body's activities in doing work and not easily feel tired (Paramashanti, 2019).

In the body the need for carbohydrates is 60-70%, there are several sources of carbohydrates, namely cereals, grains, sugar, and fruits. Carbohydrates are divided into two parts, namely simple carbohydrates which can be found in processed fruits that have been artificially sweetened such as kale and fruit syrup, while complex carbohydrates are rich in fiber and contain little sugar and are very good as components in a diet program.

The function of carbohydrates is not only as a source of energy but also as a fulfillment of healthy calorie needs, namely calories from high-fiber carbohydrates such as quinoa. Adequate carbohydrates can also reduce the risk of certain diseases. Carbohydrates are also good for maintaining muscle mass, heart health, regulating blood sugar levels. Humans who lack carbohydrates can cause weakness and take protein and fat reserves as a substitute for energy (Maharani, 2020).

According to research (Cahyadi, 2019) Quinoa is a seed not produced from plants of the rice tribe. The leaves of quinoa can also be consumed, quinoa seeds contain high protein essential amino acids, besides that quinoa seeds also contain other nutrients such as carbohydrates, calcium, phosphorus, and iron.

People usually only eat the flesh of the dragon fruit so that the skin of the dragon fruit only becomes waste, even though the skin of the dragon fruit has various benefits for our bodies, one of which can be made into jam, natural dyes, and flour. There are four types of dragon fruit plants that are cultivated, including Hylocereus undatus (dragon fruit which has red skin and white flesh), Hylocereus costaricensis (dragon fruit which has red skin and super red flesh) Hylocereus polyrhizus (dragon fruit which has red flesh). red skin and purplish-red flesh), and Selenicereus megalanthus (dragon

fruit with yellow skin and white flesh) (Santoso & Fibrianto, 2017).

Based on the explanation above, the percentage of quinoa flour and dragon fruit peel flour is 35%: 5%, 30%: 10%, 25%: 15% as a reference for making cookies where the best percentage is 30%: 10%. The idea of making cookies substituted with quinoa flour with dragon fruit peel flour is due to the macro nutritional value, especially the high protein content and low carbohydrate value, which can be used as an effort to prevent obesity in adolescents.

MATERIAL and METHOD

The type of research was a laboratory test using a one shot group design with 3 treatments, namely 35%:5%, 30%:10%, and 25%:15% in substitution of quinoa flour and dragon fruit peel flour.

The type of data obtained in this study is primary data, namely data based on laboratory tests for nutritional content in the form of protein content and carbohydrate content, which is derived from the results of the hedonic test form for accepting cookies substituted with quinoa flour and dragon fruit peel flour. Acceptance form which has 4 aspects, namely color, aroma, texture and taste. The study was conducted by 30 untrained panelists who used a hedonic scale and a numberic scale consisting of strongly dislike, dislike, somewhat like, like, and very like which contained assessments of aspects of color, aroma, texture, and taste.

RESULTS and DISCUSSION

Acceptance

a. Color Aspect

Cookies with a concentration of F1 and concentration of F2 are cookies that are preferred from the aspect of color, as many as 22 panelists (73.3%) and only 1 panelist (3.3%) who does not like / somewhat like, on cookies with a concentration of F3 with a darker color of cookies the concentration of F1 and F2 was favored by 20 panelists (76.7%) and 6 panelists (20%) who liked it somewhat. The results of the Kruskal Wallis test showed a p value> 0.05 (0.306), which means that there is no difference in preference for the color aspect of cookies with quinoa flour and dragon fruit peel flour substitution.

The color of cookies can be judged by using the sense of sight. According to research (Ramadhan et al, 2019) food that is heated, such as drying at high temperatures, experiences significant color changes in addition to the roasting process. Cookies with the substitution of quinoa flour and dragon fruit peel flour have different preferences for the color aspect depending on the level of use of dragon fruit peel flour, the more dragon fruit peel flour is given, the darker the color of the cookies.

Table 01 Acceptance Test Results of Color Aspects on Cookies Substitution of Quinoa Flour with Dragon Fruit Skin Flour

Acceptance	F1		F2		F3		P1
	n	%	n	%	n	%	
Very dislike	-	-	-	-	-	-	
Do not like	-	-	1	3.3	1	3.3	
kinda like	1	3.3	2	6.7	6	20	0.306
Like	22	73.3	22	73.3	17	56.7	
Really like	7	23.3	5	16.7	6	20	
total	30	100.0	30	100.0	30	100.0	

b. Aroma Aspect

The sample with a concentration of F1 was the most preferred sample, namely 21 panelists (70%) and F2 was the most preferred in the category of very like, namely 8 panelists (26.7%), the sample with a concentration of F3 was the least preferred sample because only as many as 15 panelists (50%) liked and somewhat liked as many as 6 panelists (20%), this is because the aroma of dragon fruit peel flour is stinging so that the use of dragon fruit

peel flour a lot will affect the level of aroma in cookies. the Kruskal Wallis test showed a p value> 0.05 (0.092), which means that there is no difference in preference for the aroma aspect of cookies with the substitution of quinoa flour and dragon fruit peel flour.

The aroma of cookies with the substitution of quinoa flour and dragon fruit peel flour has a different aroma in each concentration, F1 has a distinctive aroma of quinoa seeds, then F2 has a distinctive aroma of quinoa seeds with a slight aroma of dragon fruit peel flour and F3 has a distinctive aroma of dragon fruit peel flour. . According to research (Negara et al., 2016) aroma is an odor that arises due to chemical stimuli detected by the nerves of the sense of smell in the nasal cavity. The results showed that F2 was the most preferred concentration from the aspect of aroma as many as 27 panelists (90%) and only 3 panelists (10%) disliked. According to research by Vincent & Tongkol (2020) Pastries have an aroma that is determined from a mixture of ingredients in making cookies such as butter, eggs.

Table 02 Acceptance Test Results of Aroma Aspects on Cookies Substitution of Quinoa Flour with Dragon Fruit Skin Flour

Acceptance	F1		F2		F3		P1
	n	%	n	%	n	%	
Very dislike	-	-	-	-	-	-	0.092
Do not like	-	-	-	-	4	13.3	
kinda like	4	13.3	3	10	6	20	
Like	21	70	19	63.3	15	50	
Really like	5	16.7	8	26.7	5	16.7	
total	30	100.0	30	100.0	30	100.0	

c. Texture Aspect

At the concentration of cookies F2 is the texture of cookies that get the most likes category as many as 12 panelists (13.5%) and F1 and F3 have the same value in the like category as many as 11 panelists (12.4%) by obtaining a very dislike category as much as 1 panelist (3,3) on texture. The Kruskal Wallis test showed a p value> 0.05 (0.685), which means that there is no difference in preference for the texture aspect of cookies with quinoa flour and dragon fruit peel flour substitution. The texture of the cookies with the substitution of quinoa flour and dragon fruit skin flour is crispy and not hard nor soft, which is influenced by the length of the oven for the cookies.

According to Auliana's research (2018), cookies are judged by their texture which is the most important attribute which includes ease when broken, crunchiness and consistency. Cookies in the oven for < 30 minutes have a crunchy texture. This situation is supported by research from (Rosida et al., 2020) the crispness of the product is related to its water content because if the water content in the product is more and more evaporated in the baking process, air cavities will form. so that it can make the product more crispy

Table 03 Acceptance Test Results of Texture Aspects on Cookies Substitution of Quinoa Flour with Dragon Fruit Skin Flour

Acceptance	F1		F2		F3		P1
	n	%	n	%	n	%	
Very dislike	1	1.3	-	-	1	1.3	0.685
Do not like	5	16.7	5	16.7	5	5.6	
kinda like	8	26.7	8	26.7	10	11.2	
Like	11	12.4	12	13.5	11	12.4	
Really like	5	16.7	5	16.7	3	3.4	
total	30	100.0	30	100.0	30	100.0	

d. Taste Aspect

At the concentration of F2 has the same value in the categories like and really like that as many as 11 panelists (16.7%). At the concentration of F3 has the same value between moderately like and like categories, namely 10 panelists (11.2%). In the Kruskal Wallis test, the p value> 0.05 (0.013) which means that

there is no difference in preference for the taste of cookies with the substitution of quinoa flour and dragon fruit peel flour.

The taste of cookies with the substitution of quinoa flour and dragon fruit skin flour gives a mixed taste between quinoa seeds and dragon fruit skin which makes these cookies have a unique and sweet taste. Each recipe is given 35 grams of sugar from a total of 200 grams of ingredients. According to research by Polnaya and Breemer (2016) the taste or taste in cookies can come from food ingredients or the addition of other substances during the processing process where the taste will decrease or it can get better, such as cookies substituted with quinoa flour and dragon fruit peel flour where each concentration is given. sugar for flavoring as much as 35 gr.

Table 04 Results of Acceptance Test for Taste Aspects on Cookies Substitution of Quinoa Flour with Dragon Fruit Skin Flour

Acceptance	F1		F2		F3		p1
	n	%	n	%	n	%	
Very dislike	-	-	-	-	-	-	0.013
Do not like	2	6.7	1	3.3	5	16.7	
kinda like	6	20	7	26.7	10	11.2	
Like	12	13.5	11	13.5	10	11.2	
Really like	10	11.2	11	16.7	5	16.7	
total	30	100.0	30	100.0	30	100.0	

1. Protein and carbohydrate content

The results of the protein content of cookies in every 100 grams showed that the F1 concentration had the highest protein content of 12.36gr, then at the F2 concentration it had a protein content of 11.10gr, and continued at the F3 concentration which had a protein content of 10.81 gr. According to research (Rochmawati, 2019) the protein content in dragon fruit peel flour cookies without the addition of other flours does not meet the quality standards of SNI cookies, namely protein content <5 g/100 grams while protein content in cookies with the addition of other flours meets the quality requirements of SNI cookies.

Table 05 Protein content in 100 grams *Cookies with Quinoa Flour and Dragon Fruit Skin Substitute*

No.	Concentration	Protein Content (100 grams)
1	F1	12.36
2	F2	11.10
3	F3	10.81

Meanwhile, the results of the carbohydrate content of cookies in 100 grams showed that the concentration of F3 had a high carbohydrate content of 59.58 gr, followed by a concentration of F2 which had a carbohydrate content of 59.51 gr and the concentration of F1 had a low carbohydrate content of 57.76 gr. This is indicated by the use of dragon fruit peel flour which increases the carbohydrate content can be seen in table 3 of the study entitled Physico-chemical characteristics of red pitaya (Hylocereus polyrhizus) peel which states that the carbohydrate content of dragon fruit peel is 6.20% in 100 the gram.

CONCLUSION

The best concentration is cookies with a concentration of F2 and the protein content of cookies in 100 gr is the concentration of F1 which has a high protein content of 12.36% and the carbohydrate content of cookies in 100 gr is a concentration of F3 which has a high carbohydrate value of 59.58 %.

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Table 06 Carbohydrate Content in 100 grams of Cookies with Quinoa Flour Substitution and Dragon Fruit Skin Flour

No.	Concentration	Carbohydrate Content (100 grams)
1	F1	57.76
2	F2	59.51
3	F3	59.58

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