



Article

The Production Of Bluder Substitute Made Of Psyllium Husk Flour As Fiber-Rich Food To Prevent Constipation

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Abstract: Continuous constipation can cause several diseases such as hemorrhoids, colon cancer, diverticular disease. It is generally characterized by stool which becomes increasingly harder and larger. As a result, this causes lower frequency of defecation. Consuming highly fibrous food sources is one decent measure to address constipation. One ingredient high in fiber is psyllium husk. This study aims to determine the fiber content in bluder made of psyllium husk flour as a bread substitute to prevent constipation. It employed Completely Randomized Design (CRD) with 5 treatments (flour and psyllium husk flour), inter alia T1 (87.6% and 12.4%), T2 (86.4% and 13.6%), T3 (85.2% and 14.2%), T4 (84% and 16%), and T5 (82.2% and 17.2% flour), each of which was repeated 5 times. The results showed that T5 has the highest fiber content at 9.85 grams/60 grams. The addition of psyllium husk flour had a significant effect on fiber content and the physical properties of bluder, while the best treatment in this study was T3 (85.2% flour and 14.8% psyllium husk flour). One loaf of bluder weighing 65 grams provides energy content of 228 kcal, 9 grams of protein, 8 grams of fat, 30 grams of carbohydrates, and 4.8 grams of fiber.

Keywords: Constipation; Fiber; Psyllium.

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1. Introduction

Constipation is still considered a trivial disease as many think that obstructed defecation is not a serious issue, presumably as it is seen as a result of improper consumption of food or drinks. Continuous constipation triggers several diseases such as hemorrhoids, colon cancer, diverticular disease[1]. It is also characterized by stool becoming increasingly harder and larger, which leads to decreased frequency of defecation. Generally, constipation occurs among adolescents, early adults, and even the elderly[2].

Amelia et al. (2016) report on 66.2% cases of constipation in Madiun city, and this is claimed to be the result of the lack of fiber and fluid intake. Enzymes are vital element the human digestive tract to digest dietary fiber, but in the large intestine there is colonic bacteria responsible for decomposing dietary fiber into fiber components. Fiber helps to bind water in the large intestine to enlarge the volume of feces and thus stimulate the rectal nerves, causing the urge to defecate. Low intake of fiber intake can cause increased fecal mass and obstructed defecation[1].

Preventing or curing constipation requires lifestyle changes through pharmacological and non-pharmacological prevention. Non-pharmacological measure can be done through nutritional therapy, by increasing dietary fiber intake[3]. The recommended amount of fiber according to the 2019 Nutrition Adequacy Ratio (NAR) for males aged 19-29 years and women aged 19-29 years is 37 grams/day and 32 grams/day, respectively. Likewise, the 2016 Nutrition Fact Label recommends 30 grams/day. A Basic Health Research in 2007 documents that 93.6% of Indonesians aged >10 years have yet to consume sufficient amount of fruits and vegetables. This figure did

not seem to change in 2013 (93.5%) and in 2018 (95.5%) since the average consumption of fiber remains low, around 10.5 grams/day. Fiber consists of soluble fiber and insoluble fiber which facilitate bowel movements (laxatives) so long as sufficient water consumption is achieved (Regulation of the Head of the Food and Drug Monitoring[4]. When going through the stomach and small intestine, water-soluble fiber will absorb water and then expands into a gel-like structure, which subsequently will inhibit gastric emptying from the stomach[4]. The laxative properties of insoluble fiber can reduce the transit time of leftovers and provide a diluting effect on toxins and carcinogenic compounds as the causes of cancer[5].

Psyllium can be obtained from *Plantago* seeds. Psyllium husk is the main part derived from psyllium seeds containing insoluble fiber and soluble fiber. Psyllium consists of 75% xylose, 23% arabinose, sugars, and 35% non-terminal residue (Beikzadeh, et. al 2016). It also contains 78% soluble fiber and 13% insoluble fiber, which can absorb up to 15 grams of water per gram of psyllium[6]. Furthermore, it provides hemicellulose which consists of straight xylan chains linked to arabinose, ramnose, and galacturonic acid units, namely arabinoxylan which has a high water-holding capacity, approximately 80 times its weight[7]. Psyllium contains dietary fiber essential for addressing cardiovascular disease, constipation, weight loss, obesity, high blood pressure, colon cancer, diabetes and hypercholesterolemia[5].

Consuming 7 grams of psyllium for 6 days can increase colon volume significantly. A dose of 7 grams of psyllium causes an average individual to experience an increase of colon volume by 43%. This increase will elevate the frequency of stools in the intestine[8]. Underline the lack of research on food products fortified with psyllium, which can increase nutritional quality and therefore prevent diseases. In addition to being part of fiber formulations, psyllium supplements are available in granules, wafers, capsule form, and flour[9].

Points out that bluder is a type of bread that becomes an increasingly popular gift from Madiun city. It actually originated from the Netherlands, with its original pyramid-like texture. It is known for its very soft and slightly oily texture as it is a combination of bread and cake dough. The surface generally appears yellowish or brownish as it is also made of substantial amount of egg yolks, markedly higher than the required amount for making other types of bread[10].

In this scenario, the researchers examined psyllium husk as a food ingredient and further investigate its nutritional value of a source of fiber. By extension, the research delves into the value of macronutrients in each treatment involved, and the organoleptic properties as well as quality of bluder made of psyllium husk flour. The research results can help refine public perception of bluder made of psyllium husk and promote its nutritional advantage for preventing constipation[4]. The reason researchers use Psyllium husk is because it has benefits for maintaining blood sugar levels, lowering cholesterol levels, preventing constipation, a natural prebiotic. Psyllium husk is a water-soluble dietary fiber that can help improve digestive health and improve various health conditions such as diabetes, high cholesterol, and constipation. This ingredient is also easy to find in various fiber drink products and fiber supplements[6].

2. Materials and Methods

This laboratory experimental research employed CRD at the Food Analysis Laboratory in the Department of Agricultural Technology of State Polytechnic of Jember and CDAST Laboratory at Jember University, from February to March 2022. It involved five different treatments (T): T1 = 87.6 + 12.4; T2 = 86.4 + 13.6; T3 = 85.2 + 14.8; T4 = 84 + 16; T5 = 82.8 + 17.2, each of which was repeated five times.

The research employed fiber content test, extensibility test, organoleptic test, analysis of the best treatment, proximate test, and analysis of suggested servings. Research data were analyzed using One-Way ANOVA ($p = 0.05$). Once data normally was ascertained, Duncan test would be operative, while Kruskal-Wallis test coupled

with Mann-Whitney test would be operative in the absence of normal data distribution. The decision was taken to see the comparison of the averages of two or more groups. This facilitates the analysis of several different sample groups with minimal risk of error. It is called analysis of variance, not analysis of means because the test is carried out by comparing variances. By comparing these variances, it can be seen whether there are differences in the averages of three or more groups.

3. Results

The research focused on making bluder substitute made of psyllium husk flour to prevent constipation. The following analyses report on fiber content, extensibility, organoleptic tests involving hedonic quality, nutrition facts, the best treatment along with the nutrition content, and the recommended serving of bluder substitute on daily basis.

3.1 Fiber Content

The results of the fiber test on bluder made of psyllium husk flour are presented in Table 1 below.

Table 1. Average Fiber Content in Bluder Substitute

No.	Treatment (Flour: Psyllium Husk Flour)	Fiber (g/100g)
1.	T1 (87.6 + 12.4)	6.128 ^a
2.	T2 (86.4 + 13.6)	6.730 ^b
3.	T3 (85.2 + 14.8)	7.384 ^c
4.	T4 (84 + 16)	7.908 ^d
5.	P6 (82.8 + 17.2)	9.852 ^e

Note: The above data result from 5 recapitulations, and similar letter(s) denote insignificant difference by Mann-Whitney test ($p \leq 0.05$).

The table shows that the five treatments have significantly different fiber content as marked by $p < 0.05$. The results imply higher fiber content resulting from higher composition of psyllium husk flour. The results of the Kruskal-Wallis test granted a follow-up test using Mann-Whitney test to confirm any noteworthy difference among treatments.

The results of the Mann-Whitney test acknowledge a significant difference between the five treatments as evidenced by different letter notations in each treatment[8]. The fiber content increased along with the addition of psyllium husk flour. In the same vein, highlight that psyllium husk contains ample soluble fiber which can absorb water up to 15 g per gram of psyllium[11]. Contend that psyllium husk contains 78% soluble fiber and 13% insoluble fiber. The coating of psyllium contains hemicellulose which consists of straight xylan chains bound to arabinose, ramnose, and galacturonic, and an acid unit, namely arabinoxylan which has high water-holding capacity, approximately 80 times its weight[12]. Psyllium contains dietary fiber which plays a positive role in addressing cardiovascular disease, constipation, weight loss, obesity, high blood pressure, colon cancer, diabetes and hypercholesterolemia[5].

3.2 The Analysis of Extensibility Test

The results of the extensibility analysis on bluder substitute with psyllium husk flour are presented in Table .2 below.

Table 2. Average Fiber Content in Bluder Substitute

No.	Treatment (Flour: Psyllium Husk Flour)	Extensibility (%)
1.	T1 (87.6 + 12.4)	368.3 ^a
2.	T2 (86.4 + 13.6)	354.0 ^b
3.	T3 (85.2 + 14.8)	325.1 ^c
4.	T4 (84 + 16)	289.5 ^d
5.	P6 (82.8 + 17.2)	213.5 ^e

Note: The above data result from 5 recapitulations, and similar letter(s) denote insignificant difference by Mann-Whitney test ($p \leq 0.05$).

Table 2 shows that the five bluder substitutes have significantly different fiber content, this can be seen from the p (0.000). This implies a noteworthy effect of adding psyllium husk flour on the physical property (extensibility) of bluder. The results of the Kruskal–Wallis test on the fiber content granted the follow-up Mann–Whitney test which evidenced a significant difference between the five treatments. The addition of psyllium husk flour will affect bluder extensibility; higher addition of psyllium husk flour results in lower gluten content in the fiber-rich bluder dough, thus reducing bread extensibility. This is because gluten retains gas to get the desired volume and texture in the dough. In this regard, extensibility is closely related to the amount of CO₂ bubbles in the dough during fermentation[7].

The extensibility is also affected by the amount of water bound by the dough. Baking process leads to water loss, and this causes the gluten layers to trap and separate gases from each other by forming a protective layer to form foam, and eventually the dough extends[13]. Processed psyllium produces mucus obtained from psyllium by grinding the seed coat. Plantago seed mucilage is often referred to as chaff or psyllium husk. Ground seed mucilage is a white fibrous material that is hydrophilic, meaning that its molecular structure attracts and binds water. After absorbing water, the clear, colorless, and slimy gel expands tenfold or more. This hydrophilic nature therefore makes it difficult for the dough to expand[14].

The addition of psyllium husk increases water absorption due to the interaction of hydrogen bonds between water hydroxyl groups and polysaccharide macromolecules in the fiber[15]. A significant increase in water absorption generates a very high viscosity in dough, in which air bubbles cannot be sufficiently trapped. Increased viscosity can therefore decrease bread volume due to inhibited expansion. As such, higher percentage of psyllium husks decreases bread volume while the density increases to a significant extent [16].

3.3 Organoleptic Test

Using Microsoft Excel, this test was carried out for 1 day with an organoleptic test with 5 treatments and 5 random replications, which resulted in one panelist receiving different T1-T5 repetitions. There were 25 semi-trained panelists (bakery employees) examining the color, taste, aroma, and texture of bluder substitute made of psyllium husk flour. This test aims to determine the bread characteristics from each treatment in terms of preference and quality. The data were then analyzed by Kruskal–Wallis test, coupled with the Mann–Whitney test. The results of the hedonic quality test are explained below.

a. Color

Color is an important attribute of product attraction, identification and quality. The interval data in this regard were tested for normality. The test results showed that the hedonic test for color and hedonic quality for yellow color and hedonic quality for dark brown on bluder were not normally distributed, marked with $p < 0.05$. As such, the

Kruskal-Wallis test was performed at the confidence level of 0.05, the result of which is displayed below.

Table 3. The Results of Organoleptic Test

Treatment (Flour: Psyllium Husk Flour)	Yellow color*	Hedonic Quality Dark Brown Color*	Hedonic Color**
T1 (87.6 + 12.4)	6.48	1.64	6.28
T2 (86.4 + 13.6)	6.44	1.56	6.12
T3 (85.2 + 14.8)	6.60	1.44	6.28
T4 (84 + 16)	5.36	2.40	6.12
T5 (82.8 + 17.2)	4.72	2.84	6.04

Note: The data represent the average of 5 repetitions. *Scale 1-9 (weak yellow-strong yellow), (weak dark brown-strong dark brown). **Scale 1-9 (dislike-like)

Table 3 demonstrates no significant difference in the hedonic color in each treatment, as indicated by $p > 0.05$ (0.968), so the Mann-Whitney test was not carried out. The averages of the hedonic test results for color are between 6.04 and 6.28. In a scale of 1-9, the higher the score given by the panelists indicates the preference for bluder while low score (1 point) implies dislikes. In conclusion, different amount of psyllium husk flour did not affect the panelists' preference for the bread color.

The results of Kruskal-Wallis test showed a significant difference in the color of bluder substitutes in each treatment which was marked with a value of p (0.000), so Mann-Whitney test was performed to identify the smallest difference. The test results showed significant differences between the treatments.

As shown in Table 3, the hedonic quality of yellow bluder substitute ranged from 4.72 to 6.48. The higher the score indicates stronger yellow color, while lower score designates weaker color. The results proved that in T1 the color is stronger than that in the other treatments. While T5 shows that the yellow color on bluder becomes weaker than the other treatments. By implication, higher addition of psyllium husk flour generates weaker yellow color, and vice versa.

In Table 3, the results of Kruskal-Wallis test for hedonic quality of dark brown color show that the bluder flour has a significant difference (p 0.000) between the treatments. The Mann-Whitney test was subsequently operative to find out the smallest difference, and the results showed significant differences between the treatments.

Shown in Table 3, the averages of the hedonic quality of dark brown color range from 1.64 to 2.84 (weak-strong). The higher score indicates the stronger dark brown color while the lower score indicates weaker color. T1, with the smallest amount of added psyllium husk flour, showed weaker dark brown color while T5, with the highest amount of added psyllium husk flour, showed a stronger dark brown color.

The results of hedonic tests document higher points for yellow color than for dark brown. Color is essential property of a product. Explain that psyllium husk flour darkens the color of sponge cake, without any effect on the taste. The discoloration is due to the natural pigments present in the psyllium seed coat[17]. Affirm high fiber content in psyllium as the cause to darker color. Small amount of added psyllium husk flour did not influence panelists' preference. The yellow color is produced from margarine which may contain natural coloring agents, such as carotenoids[10].

b. Flavor

Taste is felt by taste receptors in the mouth, and this results in different sensations, such as sweet, bitter, salty and sour. This test included interval data. The results of normality test showed that the hedonic qualities associated with bitter and sweet flavors

were not normally distributed as marked by $p < 0.000$). As a result, the Kruskal-Wallis test at the confidence level of 0.05 was performed, the result of which is presented below.

Table 4. Organoleptic Results of Bluder Taste

Treatment (Flour: Psyllium Husk Flour)	Hedonic Quality		Hedonic
	Bitter*	Sweet*	Flavor**
T1 (87.6 + 12.4)	1,16	7,20	6,32
T2 (86.4 + 13.6)	1,20	7,08	6,36
T3 (85.2 + 14.8)	1,20	7,16	6,32
T4 (84 + 16)	1,16	7,04	6,20
T5 (82.8 + 17.2)	1,24	7,12	6,28

Note: The data represent the average of 5 repetitions. *Scale 1-9 (weak bitterness-strong bitterness), (weak sweetness-strong sweetness). **Scale 1-9 (dislike-like)

The test results show no significant difference in the average hedonic scores between treatments, as evidenced by $p = 0.958$, so the Mann-Whitney test was not performed. The recapitulation of the hedonic test results reports that the average hedonic scores for the bread taste range between 6.20 and 6.36. In a scale of 1-9, the higher the score indicates the preference for bluder by the panelists. The results imply no significant impact of the added psyllium husk flour on the level of panelists' preference.

The results of the Kruskal-Wallis test in Table 4 show that there is no significant difference in the average hedonic quality of bitter taste between treatments, indicated by $p = 0.949$, so Mann-Whitney test was not employed. The test results showed averages ranging from 1.16 to 1.24. Higher scores given by the panelists (leading to 9 points) indicate stronger bitter taste, while the lower scores correspond to weaker bitter taste. The findings demonstrate stronger bitter taste as a result of higher addition of psyllium husk flour. Similar findings are evident in terms of sweetness. No significant difference is identified in the average hedonic scores of sweetness in each treatment, indicated by $p = 0.989$, so Mann-Whitney test was deemed unnecessary. The scores in this regard range from 7.04 to 7.20. The higher the score is, the stronger sweetness is, and vice versa. In conclusion, higher addition of psyllium husk flour generated stronger sweetness.

The scores of sweetness parameter are higher than those of bitterness parameter, so the bluder tends to taste sweet, rather than bitter. This sweet taste is obtained from the sugar and milk added when making the dough. Meanwhile, the bitter taste is not obtained from the addition of psyllium husk flour because the addition of psyllium will not affect the taste of the substituted product[6]. Bitter taste occurs simply due to the results of uneven baking process[9].

c. Aroma

Aroma is a sensory attribute that also denotes essential property of a food product. The level of panelists' preference for a food product can increase due to the presence of decent aroma. Human's nose and the brain interprets such aromas as sour, scorched, and fragrant. The interval data was tested for normality. The test results showed that the data corresponding to the hedonic quality of bluder aroma were not normally distributed, $p < 0.000$, so the Kruskal-Wallis test at the confidence of 0.05 was conducted. The test results are shown in Table 5 below.

Table 5. The Results of Organoleptic Test of Butter Aroma

Treatment (Flour: Psyllium Husk Flour)	Hedonic Quality	Hedonic
	Butter Aroma*	Aroma**
T1 (87.6 + 12.4)	5.56	6.24
T2 (86.4 + 13.6)	5.60	6.44
T3 (85.2 + 14.8)	5.92	6.24
T4 (84 + 16)	5.72	6.36
T5 (82.8 + 17.2)	5.76	6.28

Note: The data represent the average of 5 repetitions. *Scale 1-9 (weak aroma-strong aroma). **Scale 1-9 (dislike-like)

The Kruskal-Wallis test results show no significant difference in the average aroma between treatments, which is indicated by $p = 0.947$, so the Mann-Whitney test was not employed. The test results document that the average aroma scores range between 6.24 and 6.44. In a scale of 1-9, the higher score indicates the bluder possesses favorable aroma, and vice versa. In conclusion, the addition of psyllium husk flour did not affect the panelists' preference.

The results of Kruskal-Wallis test for the hedonic quality of margarine aroma did not show any significant difference between treatments, which was indicated by $p = 0.805$, so no Mann-Whitney test was performed. Table 5 reports an average score between 5.56 and 5.92. Higher score corresponds to a stronger margarine aroma. In conclusion, regardless of the amount of psyllium husk flour added, the butter aroma remains the same between treatments. Contend that margarine can be a decent substitute for butter, due to their similar appearance, smell, consistency, taste, and nutritional value. As both are made of milk, they also share the same aroma and taste with milk[6].

d. Texture

Texture represents the visual and physical characteristics of a product as a result of combining several physical properties including the number, size, shape, and elements of different ingredients. The hedonic quality organoleptic test for texture showed that the difference in treatment with psyllium husk flour substitution on bluder, which means that the texture of psyllium husk flour substitution bluder is between soft or hollow. The interval data used in this study were tested for normality, and the results confirmed data not normally distributed as indicated by $p = 0.000$. Subsequently, the Kruskal-Wallis test at 0.05 confidence level was performed. The test results can be appreciated in Table 6.

Table 6. The Results of Organoleptic Test on Texture

Treatment (Flour: Psyllium Husk Flour)	Hedonic Quality		Hedonic
	Soft texture*	Pore texture*	Texture**
T1 (87.6 + 12.4)	6.08 ^a	5.52	6.20
T2 (86.4 + 13.6)	6.36 ^a	5.80	6.28
T3 (85.2 + 14.8)	6.40 ^{ab}	5.80	6.20
T4 (84 + 16)	5.72 ^b	5.40	6.12
T5 (82.8 + 17.2)	5.48 ^b	5.56	6.04

Note: The data represent the average of 5 repetitions. *Scale 1-9 (soft texture-porous texture).

**Scale 1-9 (dislike-like)

The results of the Kruskal-Wallis test signify no noteworthy difference in the average hedonic textures between treatments, as proven by $p = 0.858$, so the Mann-Whitney test was not carried out. The test results demonstrate the scores ranging from 6.04 to 6.28, with higher score corresponds to higher preference by the panelists. This confirms that different proportion of psyllium husk flour did not affect the panelists' preference. This finding is mirrored in the analysis of cavity texture between treatments, where no significant difference was identified, marked by $p = 0.627$. The test results show that the average hedonic quality in terms of cavity texture is between 5.52 and 5.80. Likewise, higher score implies more holes in the bread. In conclusion, higher addition of psyllium husk flour poses no impact on the cavity in the bread.

The results of Kruskal-Wallis test for hedonic quality of soft texture showed a significant difference which was marked by $p = 0.017$. A Mann-Whitney test was therefore performed to find out the smallest difference. The test results showed that there were significant differences between the treatments. In Table 6, the hedonic quality of soft textures ranges from 5.48 to 6.40. Again, higher scores correspond to softer texture of bluder. The test results in T3 showed a softer texture than the other treatments, which inferred that the higher addition of psyllium husk flour led to softer texture.

Different textures between treatments were due to the different amount of psyllium husk flour added to the bluder. Essentially, increasing the amount of psyllium husk flour can reduce the amount of gluten in the dough, so the resulting texture is not as good as bluder made of 100% wheat flour. Decreased gluten content causes the dough to be more hydrophilic, resulting in stronger interactions between starch granules. In congruence, Argues that the average pore diameter is related to bread extensibility and texture. The higher rate of extensibility implies larger cavity in the bread and thus more tender texture. Gluten in bread traps and retains gas so that bread can expand with a smooth and uniformed hollow structure and a soft and elastic texture[17]. Therefore, the more psyllium husk flour is added, the less soft the resulting texture will be.

3.4 The Best Treatment

The study employed the effectiveness index test to identify the best treatment. This was calculated by calculating the outcome value (Ov) of all variables by multiplying Ne and the normal weight of each Ov of all variables for each treatment which were then summed up. The highest Ov corresponded to the best treatment. The test results are shown in Table 7 below.

Table 7. The Identification of the Best Treatment

Treatment	T1	T2	T3	T4	T5
Ov	0.38	0.58	0.73*	0.33	0.33
Order	III	II	I	IV	IV

*) The best treatment

The data signifies that the best treatment with an Ov of 0.73 is the T3 treatment. The characteristics of T3 can be seen in Table 8 below.

Table 8. The Characteristics of the Best Treatment (T3)

Characteristics	Results
Fiber	7.384 g/100g
Extensibility	325.1%
Flavor Color	7.16/1.2/6.44 (the intensity of sweetness/ bitterness/preference for each treatment) 6.6/1.44/6.2 (the strongest yellow color of all treatments/the weakest brown color of all treatments/preference for each treatment)
Aroma	5.92/6.4 (the intensity of butter aroma/ preference for each treatment)
Texture	6.4/5.8/6.32 (the softer texture of all treatments/preference for each treatment)

Source: Research data in 2022

3.5 Nutrition Facts of Bluder

The best treatment, identified in T3, included protein, fat, carbohydrates, ash content, and water content in bluder products per 100 grams. The results of nutrient composition test are presented in Table 9 below.

Table 9. The Best Treatment Bluder Nutritional Composition

No.	Nutrition Fact/100 grams	Value	Unit	SNI	Description
1	Water	28.0	%	Max 40	Passed
2	Ash	0.006	%	Max 0.1	Passed
3	Protein	13.6	%	-	-
4	Fat	12.7	%	-	-
5	Carbohydrate	45.69	%	-	-
6	Energy (kcal)	351.46	%	-	-

Source: Research data in 2022

Water plays an important role in the formation of gluten. The required amount of water depends on the strength of the flour and the baking process. The amount of water will determine bread quality. The best bluder substitute made of psyllium husk flour was in T3 after analyzing the water content. The results were 28.0%, the resulting water content met the quality requirements for sweet bread according to SNI (Indonesia National Standard) No.8372-2018, a maximum of 40% water. Mention that water in baking process determines the consistency and rheological characteristics of the dough. In addition, it affects the dough properties during baking and overall bread quality. Water also serves as a solvent for ingredients such as salt, sugar, milk and minerals, ensuring that each ingredient is evenly dispersed in the dough[14]. The data in Table 9

show 0.006% ash content, which is in compliance with SNI 8372-2018, a maximum of 0.1%.

Protein functions as a builder and regulator in the body. As a building block, it always forms new tissues in the body and maintains existing ones. Protein is also vital for forming substances that regulate various processes in the body, such as the balance of fluid, acid, and base[7]. The best treatment also achieves 13.6% protein. Fat in the body functions as an energy source, part of cell membranes, a mediator of biological activity between cells, an insulator in maintaining body temperature balance, a shield to body organs, and a solvent for vitamins A, D, E, and K. The addition of fat gives a delicious taste and soft texture to food[10]. The analysis results report 12.7% fat content. Carbohydrates are also pivotal in determining the characteristics of food ingredients such as color, taste, and texture. Carbohydrates in the body are useful for breaking down ketosis, excessive breakdown of body protein, loss of minerals and is useful for helping fat and protein metabolism[6]. The analysis results of the best treatment marks 45.69% carbohydrate content. There is no threshold to protein, fat, and carbohydrate content in bluder according to SNI.

3.6 Serving Suggestion and Nutrition Facts of Bluder

The serving suggestion is 10% of the total daily energy requirement. Serving sizes and nutrition facts can be seen in Table 10 below.

Table 10. Serving sizes of psyllium husk flour substitution bluder

NUTRITION FACTS		
Serving suggestion: 1 bluder (65 grams)		
NUTRITION FACTS		
		% Nutrition Adequacy Ratio (NAR)
Energy	228 kcal	11%
Protein	9 grams	15%
Fat	8 grams	12%
Carbohydrate	30 grams	9%
Fiber	4.8 grams	16%
NAR is based on daily need for 2,150 kcal of energy. This rate may vary across individuals.		

Table 10 presents the nutritional value per serving based on an energy requirement of 2,150 kcal. One serving of bluder (65 grams) will afford 228 kcal of energy, 8 grams of fat, 9 grams of protein, and 30 grams of carbohydrates which can meet 10% of energy requirement. Meanwhile, 2016 Nutrition Fact Label recommends 30 grams of fiber/day. The bluder substitute has 4.8 grams of fiber in one serving, which can aid in preventing constipation. According to the Regulation of National Agency of Drug and Food Control (BPOM), number 13 of 2016 concerning supervision of claims on processed food labels and advertisements, a source of fiber should be at least 3 grams per 100 grams of product. A product is said to have high fiber content when it provides 6 grams of fiber per 100 grams of product in solid form.

4. Discussion

The discussion contains interpretation of research results, linking research results with relevant theories, literature and previous findings. The discussion is not repeating the results. Aspirations of insight are universal, preferably sources on an international scale compared to national scale and do not come from the related university environment because they are considered to have very local aspirations. Writing on the results and discussion $\pm$ 55% of the total page.

5. Conclusions

1. There is a significant difference in the fiber content of bluder substitution of psyllium husk flour to prevent constipation.
2. There is a significant difference in the extensibility test of bluder substitute made of psyllium husk flour.
3. There is a significant difference in the hedonic quality of yellow color, dark brown color, and the texture of bluder substitute made of psyllium husk flour.
4. The best treatment for bluder substitute based on the calculation of the effectiveness index, namely T3, contains 85.2% flour and 14.2% psyllium husk flour. Bluder substitute made of psyllium husk flour with 4.8 grams of fiber is highly recommended to prevent constipation, according to BPOM regulation number 22 of 2019.
5. One loaf of 65 grams bluder with the addition of psyllium husk flour provides 228 kcal of energy, 9 grams of protein, 8 grams of fat, 30 grams of carbohydrates, and 4.8 grams of dietary fiber.

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