

Characteristics of Growol Dried Noodles With Addition of Nuts Sprout Flour Substitution

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Abstract.

Growol wet noodles are a food product made from cassava which is processed into growol flour as the main ingredient, as well as additional ingredients in the form of green bean sprout flour and cowpea. Growol flour is made with the principle of cassava which is fermented spontaneously for 3 days then dried. While sprout flour is made by germinating beans for 48 hours then dried. The purpose of this study was to determine the effect of adding mung bean and tolo bean sprouts on the physical, chemical characteristics and level of preference of growol wet noodles that meet the requirements and are liked by panelists. The experimental design of this study used a Completely Randomized Design (CRD) with two factors, namely the type of sprouts (mung bean sprouts and tolo bean sprouts) and the concentration of added sprouts (0%, 20%, and 30%). Physical analysis includes color, cooking loss, and water absorption. Chemical analysis includes water content, ash content, protein, fat, carbohydrates, antioxidants and flavonoids. Organoleptic properties were tested based on the level of preference. The data obtained were then subjected to statistical analysis with a 95% confidence level using the One Way Anova method. The results of the research show that the best growol wet noodles based on physical, chemical and organoleptic characteristics are wet noodles with the addition of 30% cowpea sprout flour which has physical characteristics such as lightness intensity 42,42, redness -1.43, yellowness 13,97, cooking loss 1.21% and water absorption capacity 92.29. Chemical characteristics such as water content 57,75%(wk), ash content 1.11%(wk), protein content 7.85%(wk), fat content 0.88% (wk), carbohydrates 32,41%, antioxidant activity 16.43%RSA, fenolik 0,45 mg GAE/g, and flavonoids 4.73 mgQE/g.

Keywords: Wet Noodles; Cassava; Growol; Green Bean Sprouts and Sprouts Cowpeas.

I. INTRODUCTION

Noodles are a popular wheat flour-based food product and are loved by all levels of Indonesian society. Noodles are popular due to their practical and quick preparation and relatively affordable price. The high public interest in noodles has led to an increase in demand for noodles, leading to an increase in the need for wheat flour as a raw material. Public consumption of wheat flour-based foods has also increased in general, as indicated by an increase in wheat imports into Indonesia in 2023, reaching 10.87 million tons, a 14.90% increase from the previous year's 9.46 million tons (Central Statistics Agency, 2023). In general, flour-based noodles increase the glycemic index in the body and can trigger obesity and diabetes mellitus. According to a WHO report, the total number of people with diabetes globally reached around 2.8% in 2000, and is expected to jump to 4.4% by 2030. The number of people with diabetes increased from 171 million in 2000 to 366 million in 2030 (Perkeni, 2011). Therefore, it is recommended to replace high-glycemic-index carbohydrate foods with low-glycemic-index foods, such as cassava, which has a low glycemic index (Husna et al., 2023). Cassava (*Manihot esculenta*) is one of the world's most important carbohydrate crops, grown in tropical regions. At harvest, cassava has a high water content of 60-70%.

This makes it susceptible to damage, such as mold, the appearance of blue-black spots, and even rot if not processed promptly. This damage to cassava causes a decline in its price or economic value during the peak harvest (Suismono, 2001). Therefore, fermentation is necessary to prevent and minimize damage to cassava, one of which is the development of growol. Growol is a traditional food from Kulon Progo Regency made from fermented cassava, which is soaked for 3-5 days. Processing growol into growol flour aims to utilize and maximize the use of local commodities, thereby reducing dependence on wheat flour consumption. According to Nurkhayatun and Kanetro (2018), growol flour has similar properties to wheat flour, making it potentially useful as a substitute for wheat flour in noodle making. However, growol flour

has a low protein content, so it needs to be supplemented with protein sources, one of which is bean sprouts. Sprouts are the initial plant form of legume seeds that undergo a germination process. This germination process results in changes in nutritional value compared to the seed itself. Germination not only increases protein content quantitatively but also its quality. Germination converts protein compounds into albumin and globulin, thus improving the quality of the sprouted protein compared to the seed and making it more easily digestible (Shewry et al., 1995). This study aims to obtain a formulation of Growol wet noodles with the addition of mung bean and tolo bean sprout flour that is acceptable to the public through organoleptic tests and contains protein and antioxidants.

II. METHODS

Material

The ingredients used to make Growol wet noodles are cassava, germinated mung beans and tolo beans, cornstarch, salt, soda ash, STTP, and spinach juice obtained directly from shops and traditional markets in the Yogyakarta area. Meanwhile, the chemicals used for chemical analysis include distilled water, H₂SO₄ (concentrated), NaOH, DPPH, 4% H₃BO₃, Na Thio, 0.02 N HCl, Mr: BCG indicator, 80% methanol, catalyst, Petroleum Benzene, Follin, Na₂CO₃, AlCl₃, Arsenomolibate, Nelson A, Nelson B.

Growol Flour Making Process

The process of making growol flour begins with sorting the cassava. The cassava selected must be fresh, intact, and free from damage. The next step is peeling the cassava to separate the flesh from the outer and inner skin. After the peeling process is complete, the cassava is washed under running water. The wash cassava is then cut into approximately 5 cm pieces to ensure uniform size. Afterward, the cassava is soaked in water at a ratio of 1:3 (w/v). The next process is harvesting, which consists of three stages: washing, filtering, and squeezing. Washing is done using running water to remove odors. Filtering is done using calico cloth, followed by a squeezing process to reduce the water content. The next step is pressing using a hydraulic press to further reduce the water content and speed up the drying process. The pressed growol is then dried using a cabinet dryer at 50-60°C for 4-5 hours. This process further reduces the water content and reduces the presence of pathogenic bacteria. After drying, the growol is cooled to room temperature. The next step is to grind the growol into a coarse flour, which is then sieved to obtain a fine growol flour. The process of making growol flour can be seen in Figure 1 below.

Sprouts Flour Making Process

The process of making bean sprout flour begins with sorting the mung beans and tolo beans. Then, wash the beans to separate them from dirt and soil. Next, soak the clean beans in water for approximately 8 hours. This is done to help provide water during the germination process and accelerate seed imbibition. After soaking, germination is carried out for approximately 48 hours. The next stage, separate the sprouts from their skins and then dry them in a cabinet dryer at a temperature of 50-60°C for 10-12 hours. Next, grind the dried sprouts to obtain a fine sprout flour. The Process of Making Wet Noodles Using Growol Flour and Sprouts Flour. The process of making wet noodles begins with Mixing ingredients such as growol flour, bean sprout flour, cornstarch, salt, etc. The dough is mixed until it forms sand, then steam the dough for 5 minutes until the dough forms like tiwul. Cool it and then put it into the noodle making machine. The formed noodle strands are dried in a cabinet dryer for 3-4 hours at a temperature of 50°C. The final stage is to boil the noodles for 8 minutes. The process of making wet growol noodles with the addition of mung bean and tolo bean sprout flour can be seen in Figure 3 below.

Analysis

Research analysis of Growol wet noodles with the addition of mung bean and tolo bean sprout flour includes:

1. Physical characteristics
 1. Color using a Colorimeter
 2. Water Absorption Capacity / Rehydration Capacity (Romlah and Haryadi, 1997)
 3. *Cooking Loss* (Kamsiati et al., 2021)

2. Chemical Characteristics

1. Gravimetric Water Content Method (AOAC 2006)
2. Ash Content (AOAC 2006)
3. Fat Content Soxhlet Method (Sudarmadji, Haryono, and Suhardi, 1997)
4. Kjeldahl Method Protein Content (AOAC, 2005)
5. Level Carbohydrates by difference (AOAC 2005)
6. Antioxidant Levels Using the DPPH Method (Huang, Chang and Shao, 2005)
7. Level Flavonoids UV-Vis Spectrophotometry Method

3. Level of preference (Setyaningsih et al., 2010)

Data analysis

The data that has been obtained and collected will then be analyzed using software SPSS Version 25 with 95% significance. Data analysis was performed using the ANOV (Analysis of Variance) method and further tested using the DMRT (Duncan Multiple Range Test).

III. RESULT AND DISCUSSION

Physical Characteristics of Growol Wet Noodles

Physical characteristic testing of Growol wet noodles with the addition of mung bean and tolo bean sprout flour consisted of three tests: color intensity, water absorption capacity (DSA), and cooking loss. Physical testing was conducted to determine the effect of adding mung bean and tolo bean sprout flour on the resulting Growol wet noodles.

1. Color

Color is a crucial aspect in determining the quality of a food product and its impact on consumer acceptance. Furthermore, color can be an attractive factor for consumers to purchase. Below you can see the results of the color test of Growol wet noodles with sprouts in Table 9 below.

Table 1. Color Intensity (L^* , a^* , b^*) of Growol Wet Noodles with Bean Sprouts Flour Substitution

Sample	L^*	a^*	b^*
Control	46.30±0.36e	-1.82±0.05a	10.62±0.16a
KKH 20%	44.53±0.24d	-2.78±0.02d	11.13 ±0.41c
KKH 30%	40.34±0.12b	-3.70±0.03e	15.16 ±0.14bc
KKT 20%	44.59±0.17c	-2.26±0.04c	11.49 ±0.04b
KKT 30%	42.42±0.12a	-1.43±0.03b	13.97±0.42d

Description: Numbers followed by different letters in the column

ae shows a significant difference at the 95% confidence level ($\alpha < 0.05$)

Information:

KKH = Mung Bean Sprouts

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a. Lightness (L^*)

Table 9 shows that the addition of mung bean and tolo bean sprout flour had a significant effect ($p < 0.05$) on the brightness level (L^*) of Growol wet noodles. The brightness level ranged from 40.34 to 44.59. The lowest brightness level was 40.34, which was in the treatment of adding 30% mung bean sprout flour. The highest brightness level was 44.59, which was in the treatment of Growol wet noodles with the addition of 20% tolo bean sprout flour. Meanwhile, in the control Growol wet noodles, the brightness level produced had the highest value compared to wet noodles with added sprout flour, which was 46.30. This shows that the less bean sprout flour added, the higher the brightness level (L^*) of the resulting growol wet noodles. This is because the addition of a low composition of bean sprout flour and a high content of growol flour results in a lighter color of the resulting growol wet noodles. The more growol flour added, the lighter or brighter the resulting color. This is because the color of growol flour is whiter when compared to wheat flour (Nugraheni, 2016). Conversely, if more bean sprout flour is added, the resulting L^* value will be lower. This is due to the browning reaction, namely the Maillard reaction, a non-enzymatic reaction between amino groups and reducing groups that produces brown pigment. According to research by Ubadillah and

Hersoelistyorini (2010), the Maillard reaction is the browning of food due to heating, usually due to a chemical reaction between reducing sugars and free amino acids.

b. Redness(a*)

Table 9 shows that the addition of mung bean and tolo bean sprout flour has a significant effect ($p < 0.05$) on the redness (a*) of the resulting wet growol noodles. The redness level ranges from (-3.70) to (-1.43). The lowest redness level is -3.70, which is in the growol noodle treatment with the addition of 30% mung bean sprout flour. While the highest redness level is -1.43, which is in the growol noodle treatment with the addition of 30% tolo bean sprout flour. The redness color value is negative, meaning the product is green. The green color is caused by the addition of spinach juice. Spinach contains chlorophyll pigments that give plants their green color (Dharmadewi, 2020).

c. Yellowness(b*)

Table 9 shows that the addition of mung bean and tolo bean sprout flour significantly affected ($p < 0.05$) the yellowness of Growol wet noodles. The yellowness level ranged from 11.13 to 15.16. The lowest yellowness level was 11.13, which was achieved with the addition of 20% mung bean sprout flour. While the highest yellowness level was 15.16, which was achieved with the addition of 30% mung bean sprout flour. The greater the addition of sprout flour, the higher the yellowness. A positive yellowness value means that Growol wet noodles are yellowish. The yellowness value of noodles with added mung bean sprout flour is higher than that of those with mung bean sprout flour. This is likely due to the natural pigments contained in mung bean sprouts. Mung bean sprouts contain natural pigments such as flavonoids and carotenoids that can give noodles their yellow color. Certain flavonoids, such as flavonols, contribute to the yellow color, while carotenoids such as xanthophylls also contribute to the yellow color (Siatan, 2019).

2. Cooking Loss

Cooking loss is the amount of solids that come out of the noodle strands after cooking (Aminullah, 2024). The table of cooking loss analysis results can be seen in Table 10 below.

Table 2. Cooking Loss Growol Wet Noodles with Bean Sprouts Flour Substitution

Sample	% Cooking Loss
Control	1.59±0.04b
KKH 20%	1.40±0.10b
KKH 30%	0.92±0.18a
KKT 20%	1.37±0.04b
KKT 30%	1.21±0.01b

Note: Numbers followed by different letters in column ab indicate significant differences at the 95% confidence level ($\alpha < 0.05$)

Information:

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Table 10 shows that the addition of mung bean sprout flour and tolo bean sprout flour had a significant effect ($p < 0.05$) on the cooking loss of Growol wet noodles. The cooking loss values ranged from 0.92 to 1.40. The lowest cooking loss value was found for wet noodles with the addition of 30% mung bean sprout flour at 0.92. The highest cooking loss value was found for wet noodles with the addition of 20% mung bean sprout flour at 1.40. The maximum cooking loss value for wet noodles was 10% (Maemunah et al., 2022). The cooking loss of the noodles produced in this study met the requirements. This indicates that the more bean sprout flour (mung bean and tolo bean) is added, the lower the cooking loss value of wet noodles. Low cooking loss means that when the noodles are cooked, only a small amount of components such as starch, protein, or minerals dissolve into the cooking water. The low cooking loss value with the addition of 30% mung bean sprouts is due to the protein's role in forming a sturdy noodle structure and reducing solids loss during cooking. According to Rara et al. (2020), the protein in wet noodles functions as a binder to prevent them from dissolving easily in water and to form viscosity.

3. Water Absorption Capacity (WS)

Water absorption is the ability of wet noodles to absorb water during the boiling process until the noodles are fully cooked. A higher water absorption indicates that the noodles can absorb more water during cooking, resulting in noodles that expand more (Putra et al., 2019). The results of the water absorption analysis can be seen in Table 11 below.

Table 3. Water Absorption Capacity of Growol Wet Noodles with the Addition of Bean Sprouts Flour

Sample	% Water Absorption Capacity
Control	89.26±0.53a
KKH 20%	91.53±0.11b
KKH 30%	93.86±0.45d
KKT 20%	91.39±0.28b
KKT 30%	92.29±0.17c

Note: Numbers followed by different letters in column ad indicate significant differences at the 95% confidence level ($\alpha < 0.05$)

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Table 11 shows that the addition of mung bean and tolo bean sprout flour had a significant effect ($p < 0.05$) on the water absorption capacity of Growol wet noodles. The absorption value ranged from 91.39 to 93.86. The water absorption capacity of wet noodles with the addition of mung bean sprouts was higher than with the addition of tolo bean sprouts because mung bean sprouts have a higher protein content than tolo bean sprouts. Protein plays an important role in water absorption due to its ability to form hydrogen bonds with water molecules. Water absorption capacity indicates the condition of the noodles after the boiling process. The higher the water absorption value, the more the noodles will expand. This is due to the hydrophilic nature of the protein in the sprouts. According to Chinma et al. (2013), the main elements that play a role in increasing water absorption are protein and carbohydrates due to the presence of hydrophilic poles.

A. Chemical Characteristics of Growol Wet Noodles

Chemical characteristic testing conducted on Growol wet noodles with the addition of mung bean and tolo bean sprouts consisted of seven tests: water content, ash content, protein, fat, carbohydrate, antioxidants, and flavonoids. Chemical testing was conducted to determine the effect of adding mung bean and tolo bean sprout flour on the resulting Growol wet noodles. The results of the proximate analysis can be seen in Table 12 below.

Table 4. Proximate Analysis of Growol Wet Noodles with Bean Sprouts Flour Substitution

Parameter / Sample	Water content (bb%)	Ash content (bb%)	Protein (bb%)	Fat (bb%)	Carbohydrate (by difference)
Control	50.25 ± 1.49d	0.95 ± 0.10a	3.87 ± 0.50a	0.55 ± 0.05a	44.38 ± 0.26a
KKH 20%	54.49 ± 0.39a	1.44 ± 0.10b	5.70 ± 0.24b	0.57 ± 0.04a	37.80 ± 0.11e
KKH 30%	58.83 ± 0.07c	1.34 ± 0.15b	8.68 ± 0.28c	0.54 ± 0.13a	30.61 ± 0.06c
KKT 20%	53.71 ± 0.44b	0.47 ± 0.62a	5.34 ± 0.38b	0.57 ± 0.06a	39.90 ± 0.13d
KKT 30%	57.75 ± 0.07e	1.11 ± 0.30b	7.85 ± 0.10b	0.88 ± 0.26b	32.41 ± 1.51b

Note: Numbers followed by different letters in column ae indicate significant differences at the 95% confidence level ($\alpha < 0.05$)

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4. Water content

Water is an important component in food ingredients because water can affect consumer acceptance, freshness and durability of ingredients (Winarno, 2004). Table 12 shows that the addition of mung bean and tolo bean sprout flour significantly ($p < 0.05$) affected the moisture content of Growol wet noodles. The moisture content of Growol wet noodles ranged from 53.71 to 58.83. The lowest moisture content was 53.71 in the treatment with 20% addition of mung bean sprout flour. Meanwhile, the highest moisture content was

58.83 in the treatment with 30% addition of mung bean sprout flour. The moisture content of these cooked wet noodles meets the Indonesian National Standard, which is a maximum of 65% (SNI, 2015). The results of this study on water content showed that the higher the addition of sprouts, the higher the water content of the wet noodles. This is due to the protein content in the sprouts, which absorbs water. According to Suryaalamshah (2023) in Rahayu (2023), sprouts contain protein components that exhibit hygroscopic properties, meaning they can absorb water.

5. Ash Content

Ash is the inorganic residue after a material is burned at a high temperature. Table 12 shows that the addition of mung bean and tolo bean sprout flour significantly differed ($p < 0.05$) in the ash content of Growol wet noodles. The ash content values ranged from 0.47 to 1.44. The lowest ash content value was 0.47 in the treatment with the addition of 20% mung bean sprout flour. While the highest ash content value was 1.44 in the treatment of Growol noodles with the addition of 20% mung bean sprout flour. The ash content of Growol wet noodles with added sprouts in this study exceeded the Indonesian National Standard (SNI) of 0.05%, a maximum. This is due to the addition of ingredients such as soda ash and STPP. Soda ash and STPP are alkalis. This is in accordance with the opinion of Anggrahini et al. (2006), who explained that alkali salts, basic ingredients, and the flour used affect the ash content of noodles. The ash content of Growol wet noodles depends on the mineral content of the flour used. The high ash content is due to the high mineral content of mung bean flour, which is a raw material. Mung bean flour has a fairly high mineral content. Per 100 grams of mung bean flour contains 125 mg of potassium, 6.7 mg of iron, and 320 mg of phosphorus (Ministry of Health and Nutrition of the Republic of Indonesia, 1992).

6. Protein

Table 12 shows that the addition of mung bean and tolo bean sprout flour had a significant effect ($p < 0.05$) on the protein content of Growol wet noodles. The protein value ranged from 5.34 to 8.68. The protein value of wet noodles with the addition of mung bean and tolo bean sprout flour was higher than the control wet noodles, which was 3.87. Noodles with the addition of 30% mung bean sprout flour had the highest protein content, which was 8.68. Table 12 shows that the higher the addition of bean sprout flour, the higher the protein content of wet noodles. The protein content of wet noodles with the addition of mung bean sprout flour is higher than that with the addition of tolo bean sprout flour. This is because mung bean sprout flour has a higher protein content than tolo bean sprout flour. According to Dirga et al. (2015), mung bean sprout flour has 28.50% protein. Meanwhile, tolo bean sprout flour contains 22.31% protein (Saputro et al., 2015).

7. Fat

Table 12 shows that the addition of mung bean and tolo bean sprout flour did not significantly differ ($p > 0.05$) in the fat content of Growol wet noodles. The fat content of wet noodles ranged from 0.54 to 0.88. The lowest fat content value was 0.54 in the treatment with the addition of 30% mung bean sprout flour. While the highest fat content value was 0.88 in the treatment of Growol noodles with the addition of 30% tolo bean sprout flour. According to Aminah (2012, in Duda et al., 2023), mung bean sprout flour has a fat content of 4.97. Meanwhile, according to Elvira et al. (2019), mung bean sprout flour contains 1.24 fat. The fat content of wet noodles decreases compared to the fat content of the sprout flour itself. This is because high temperatures, both in drying and boiling, can cause denatured proteins to lose their capacity to bind or emulsify fat, so that fat is more easily released from the food matrix. According to Handayani et al. (2023), that loss of fat content can occur due to protein denaturation in the tissue at a level that can cause a decrease in the protein's emulsification properties.

8. Carbohydrate

Carbohydrates are one of the three main macronutrients needed by the human body, besides protein and fat. Table 12 shows that the addition of mung bean and tolo bean sprout flour significantly ($p < 0.05$) affected the carbohydrate content of Growol wet noodles. The carbohydrate value of the wet noodles ranged from 30.61 to 39.90. The lowest carbohydrate value was 30.61 in the treatment with the addition of 30% mung bean sprout flour. While the highest carbohydrate value was 39.90 in the treatment of Growol noodles with the addition of 20% tolo bean sprout flour. The higher the addition of mung bean and tolo bean flour, the

lower the carbohydrate content. This is due to the increased proportion of protein and other components that replace or reduce the proportion of carbohydrates in the formulation. This aligns with research by Duda et al. (2023), who stated that the decrease in carbohydrate content in waffles is associated with an increase in other nutritional content, such as protein and fat. Analysis of antioxidants, phenolics, and flavonoids of Growol wet noodles with bean sprout flour substitution can be seen in Table 13 below.

Table 5. Analysis of Antioxidants, Phenolics, and Flavonoids in Growol Wet Noodles with Bean Sprouts Flour Substitution

Sample	Antioxidants (% RSA)	Phenolic (mg GAE/g)	Flavonoid (mg EK/g)
Control	1.91 ± 0.16a	0.45 ± 0.00a	4.45 ± 0.0a
KKH 20%	13.35 ± 0.41c	0.48 ± 0.04a	4.57 ± 0.0ab
KKH 30%	28.72 ± 0.32e	0.47 ± 0.01a	4.77 ± 0.13b
KKT 20%	7.0 ± 0.41b	0.47 ± 0.02a	4.69 ± 0.24ab
KKT 30%	16.43 ± 0.50d	0.47 ± 0.01a	4.73 ± 0.20ab

Note: Numbers followed by different letters in column ae indicate significant differences at the 95% confidence level ($\alpha < 0.05$)

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9. Antioxidants

Antioxidants are substances with a molecular structure that can donate electrons, specifically hydrogen atoms, to free radical molecules without inhibiting their activity and can break free radical chain reactions (Puspitasari et al., 2016). The results of the antioxidant analysis can be seen in Table 13. Table 13 shows that the addition of various bean sprout flours had a significant effect ($p < 0.05$) on the antioxidant content of Growol wet noodles. The antioxidant content of Growol wet noodles ranged from 7.0 to 28.72. The lowest antioxidant content of Growol wet noodles with sprouts was 7.0, which was in the treatment with the addition of 20% mung bean sprout flour. The highest antioxidant content of Growol wet noodles with sprouts was 28.72, which was in the treatment with Growol noodles with the addition of 30% mung bean sprout flour. Meanwhile, the control wet noodles had the lowest antioxidant value compared to the wet noodles with added bean sprouts. This indicates that the higher the addition of sprout flour, the higher the antioxidant content of Growol wet noodles. Mung bean sprouts contain higher antioxidants than those of tolo beans. According to Nurung (2016), mung bean sprouts can be used as antioxidants, containing 1.33% phenolics, 1.25% flavonoids, and 0.003% carotenoids. Meanwhile, germinating tolo beans increases the phenolic compound content (Putri et al., 2021).

10. Phenolic

The results of the phenolic analysis can be seen in Table 13. showed that the addition of mung bean and tolo bean sprouts did not significantly differ ($p > 0.05$) on the phenolic content of Growol wet noodles. The phenolic value ranged from 0.47-0.48. The phenolic value of noodles with the addition of mung bean or tolo bean sprout flour was greater than that of the control wet noodles. Phenolic compounds in Growol wet noodles can interact with other compounds, such as protein, starch, and fiber, in the noodles. This reduces the availability or content of phenolics in the wet noodles. Some phenolic compounds can also become trapped in the starch matrix, thus degrading during the wet noodle processing process. Phenolic interactions with protein compounds form water-insoluble tannins, thus affecting the availability of phenolic compounds in food products. (Wulandari et al., 2021)

11. Flavonoid

Flavonoids are a group of organic molecules found in almost all parts of plants. Flavonoids have potential as antioxidants (Goldberg, 1996). Table 13 shows that the addition of mung bean and tolo bean sprouts did not significantly differ ($p > 0.05$) on the flavonoid content of Growol wet noodles. Flavonoid values ranged from 4.57 to 4.77. The lowest flavonoid value was 4.57 in the treatment with the addition of 20% mung bean sprout flour. The highest flavonoid content was 4.77 in the Growol noodle treatment with

the addition of 30% mung bean sprout flour. Meanwhile, the flavonoid content of the control wet noodles was the lowest at 4.45 compared to the wet noodles with sprouts added. According to a statement from the Ministry of Health (2017), wet noodles contain other components such as calcium 77 mg, phosphorus 449 mg, iron 6.50 mg, vitamin A 30 IU, vitamin B1 0.92 mg, and vitamin C 2 mg. This can cause other components, such as flavonoid levels, to decrease. Furthermore, the steaming or drying process reduces the flavonoid content of wet noodles. High temperatures can reduce the flavonoid content in wet noodles; the higher the drying temperature, the lower the flavonoid content (Syafarida et al., 2019).

B. Growol Wet Noodles Like Level

The test of the level of preference for Growol wet noodles with the addition of bean sprout flour aims to determine the level of panelists' preference for Growol wet noodles. The assessment is carried out by giving a score from 1 to 5 (1 = very dislike, 2 = dislike, 3 = somewhat like, 4 = like, 5 = very like). The test of the level of preference uses the hedonic method with 20 panelists. This test includes 5 parameters including color, taste, aroma, texture, and overall level. The results of the test of the level of preference for Growol wet noodles with the addition of bean sprout flour can be seen in Table 15 below.

Table 6. Sensory Test of Growol Wet Noodles with Bean Sprouts Flour Substitution

Sample	Aroma	Color	Flavor	Texture	Overall
Control	3.50±0.76b	3.95±0.88b	3.85±0.67c	3.90±0.78b	3.95±0.68b
KKH 20%	3.55 ± 0.60b	3.50 ± 0.94b	3.55 ± 0.68bc	3.80 ± 0.76b	3.50 ± 0.68b
KKH 30%	2.80 ± 0.84a	2.65 ± 1.08a	2.45 ± 0.92a	1.95 ± 0.88a	3.26 ± 0.99a
KKT 20%	3.30 ± 0.73b	3.70 ± 0.80b	3.10 ± 0.71b	3.40 ± 0.88b	3.40 ± 0.82b
30% Summit	3.10±0.82b	3.50 ± 0.88b	3.00± 0.94bc	3.00 ± 0.81b	3.50 ± 1.00b

Note: Numbers followed by different letters in the same column indicate significant differences at the 95% confidence level ($\alpha < 0.05$).

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The overall assessment is an assessment of all parameters, including color, aroma, taste, and texture. The overall assessment includes attractive color, good aroma, and texture, as well as having a good taste. Based on Table 15, it can be seen that the overall organoleptic assessment of rowol wet noodles ranges from 3.26 to 3.50. The highest score for growol wet noodles is the treatment of growol wet noodles with the addition of 20% mung bean sprout flour and 30% mung bean sprout flour with a score of 3.50 (like). Meanwhile, the lowest score is for growol wet noodles with the treatment of adding 30% mung bean sprouts with a score of 3.26 (somewhat like).

IV. CONCLUSION

Wet noodles with the addition of 30% mung bean sprout flour has physical characteristics such as lightness intensity 42.42; redness -1.43; yellowness 13.97; cooking loss 1.21% and water absorption capacity 92.29. Wet noodles with the addition of 30% mung bean sprout flour have chemical characteristics such as water content of 57.75% (bb), ash content of 1.11% (bb), protein content of 7.85% (bb), fat content of 0.88% (bb), carbohydrate of 32.41% (bb), antioxidant activity of 16.43%RSA, phenolic 0.45 mg GAE/g, and flavonoid 4.73 mg EK/gram. Wet noodles with the addition of 30% mung bean sprout flour were preferred for color parameters, somewhat preferred for parameters (aroma, taste, texture, and overall).

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