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**The Effect of Egg White and Dragon Fruit Purée Addition on
the Characteristics of Milk Pudding as a Snack for Cancer
Patients at RSUD Bali Mandara**

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Abstract

Nutritional disorders in cancer patients are caused by the cancer itself, the effects of chemotherapy, radiation therapy, and psychological factors, thus the form of food provided must be adjusted to the patient's condition. Milk pudding is a dessert made from fresh milk and gelling agents, characterized by its soft texture and distinctive taste. Egg white is rich in protein and low in fat, while dragon fruit is known for its high antioxidant content. This study aimed to determine the effect of adding egg white and dragon fruit puree on the characteristics of milk pudding as a supplementary food for cancer patients. This research is an experimental study with a randomized block design, involving 5 types of treatments with 3 replications each. Treatments included P1 (10%), P2 (15%), P3 (20%), P4 (25%) and P5 (30%) Based on subjective quality tests, significant differences were found in the addition levels regarding color, aroma, taste, and texture, as well as hedonic quality aspects including color, aroma, taste, and texture. However, there were no significant differences observed in protein content and antioxidant capacity. The protein content ranged from 1.96% to 2.62%, while antioxidant capacity ranged from 23,714.24 ppm to 43,827.10 ppm. Treatment 4 was identified as the best treatment, with a protein content of 2.47 grams, meaning that one serving of milk pudding fulfills 3.8% of the daily protein requirement for adult men and 4,12% for adult women aged 30–49 years according to the Recommended Dietary Allowances.

Keywords: Milk Pudding, Dragon Fruit, Egg White, Protein Content, Antioxidant Capacity

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INTRODUCTION

Cancer is one of the non-communicable diseases that causes a significant burden on both health and the economy. It is the second leading cause of death worldwide, with an estimated 9.6 million deaths in 2018. According to WHO data, the most common types of cancer in men are lung, prostate, colorectal, stomach, and liver cancer. In women, the most frequently diagnosed cancers include breast, colorectal, lung, cervical, and thyroid cancer (Dewi, 2024). In Indonesia, the prevalence of cancer has increased, from 1.4 per 1,000 population in 2013 to 1.79 per 1,000 population in 2018 (Riskseddas, 2018).

RSUD Bali Mandara is one of the most comprehensive cancer centers in Eastern Indonesia. In addition to treatment, it also offers early cancer detection services, allowing for earlier intervention and better outcomes. The integrated cancer care service at RSUD Bali Mandara has been operating since May 31, 2022. The services include diagnosis, chemotherapy, radiotherapy, and surgery. Over the past year, the number of cancer patient visits included 611 inpatient chemotherapy visits,

1,742 one-day care chemotherapy visits, and 12,712 outpatient visits.

Nutritional problems in cancer patients may arise either from the disease itself or as a side effect of treatment. Patients often experience a drastic loss of appetite due to nausea from chemotherapy, gastrointestinal disturbances from radiotherapy, or psychological stress such as anxiety and depression. This condition affects the form of food that can be given. Some patients are still able to consume solid or liquid foods, but in severe cases, they are unable to eat orally at all, requiring nutrition to be administered intravenously during hospitalization.

Pudding is a popular dessert due to its sweet taste and soft texture. Milk pudding is a type of dessert made from fresh milk or a mixture of dairy products with thickening agents, through a process of mixing, heating, stirring, packaging, and cooling. According to BPOM (2019), milk pudding is a soft-textured dessert made from milk or its derivatives, combined with starch or gelling agents, and can be enriched with other food ingredients. It is known for its smooth texture, ease of

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melting in the mouth, and distinctive aroma and flavor.

Protein is an essential nutrient that serves as a building and regulatory substance in the body. It plays a vital role in supporting growth and tissue maintenance, maintaining fluid and pH balance, and contributing to the immune system through the production of antibodies. One of the main types of protein in egg whites is albumin, which makes up about 95% of the total protein in that part. Egg white protein is free of fat and cholesterol, making it a healthy dietary choice (Ramadhani et al., 2018).

Dragon fruit (*Hylocereus polyrhizus*) is a tropical and subtropical fruit widely cultivated in Indonesia, Taiwan, Vietnam, Malaysia, and the Philippines. Red dragon fruit contains various nutrients and bioactive compounds that offer health benefits, particularly in supporting digestive health and reducing cancer risk. Every 100 grams of red dragon fruit contains water (85.7 g), energy (71 kcal), protein (1.7 g), fat (3.1 g), carbohydrates (9.1 g), and fiber (3.2 g). It also contains ash (0.4 g), calcium (13 mg), phosphorus (14 mg), magnesium (0.10 mg),

potassium (128 mg), sodium (10 mg), iron (0.4 mg), and zinc (0.4 mg). Additionally, it contains vitamins B1 (0.5 mg), B2 (0.3 mg), B3 (0.5 mg), vitamin C (1 mg), and vitamin E (0.4 mg).

Some important antioxidant compounds found in red dragon fruit include vitamin E, vitamin C, flavonoids, carotenoids such as lycopene and beta-carotene, betalains, hydroxycinnamates, and natural pigments such as betacyanin and betaxanthin, all known for their potential in neutralizing free radicals (Aryanta, 2022).

Antioxidants are nutrient or non-nutrient substances found in food that can prevent or inhibit oxidative damage in the body. They work by neutralizing free radicals, with key contributors including vitamins A, C, and E, as well as carotenoid compounds, which are effective in protecting cells from oxidative damage. Several antioxidants such as lycopene and hydroxycinnamates are known to help prevent the development of cancer cells. Previous studies have shown that red dragon fruit contains the highest level of polyphenols compared to other dragon fruit species, approximately 86.13 ± 17.02 mg

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per 0.50 grams of dried extract. This high polyphenol content serves as a natural antioxidant. Furthermore, 600 grams of red dragon fruit contain approximately 8.88 mg of antioxidant compounds, equivalent to vitamin C.

Therefore, the author is interested in studying the addition of egg white and dragon fruit to the characteristics of milk pudding as a snack for cancer patients.

METHOD

The ingredients used in the preparation of milk pudding include agar-agar, granulated sugar, UHT milk, Nutrijell, white egg, and dragon fruits. The organoleptic testing was conducted in the Nutrition Installation Kitchen at RSUD Bali Mandara, covering both product preparation and sensory evaluation. Meanwhile, the analysis of protein content and antioxidant activity was carried out at the Warmadewa University Laboratory. The study was conducted from February to April 2025.

This research is an experimental study using a Randomized Complete Block Design. The study involved five different treatments, each replicated three times,

resulting in a total of 15 experimental units. The treatments consisted of: P1 (10% addition), P2 (15% addition), P3 (20% addition), P4 (25% addition), and P5 (30% addition). The ratio of egg white to dragon fruit purée was 1:2. The parameters observed included subjective quality testing through organoleptic assessment (color, aroma, taste, and texture), and objective quality testing, which included protein content and antioxidant activity. After data collection, parametric analysis was performed using Analysis of Variance (ANOVA). If significant differences were found, the analysis was followed by Least Significant Difference (LSD) test to determine differences between treatments.

RESULTS

Organoleptic Test Results

Subjective analysis was conducted through an organoleptic test involving 30 semi-trained panelists. The panelists consisted of nutritionists and food service staff working at RSUD Bali Mandara. The hedonic test evaluated the attributes of color, aroma, texture, and taste of the milk pudding, using a 5-point scale: strongly like, like, neutral, dislike, and strongly

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dislike. The results of the hedonic evaluation are presented as mean values in Table 1 below.

Table 1. Average Scores of Hedonic Test on Milk Pudding

Treatments	Average Scores of Subjective Analysis			
	Color	Aroma	Taste	Texture
1	,90c	,50a	,23b	,57a
2	,33b	,53a	,30b	,53a
3	,00a	,70a	,53ab	,50a
4	,33a	,53a	,80a	,93a
5	,71a	,63a	,63ab	,50a

Note: Different letters following the mean values indicate a highly significant difference based on the Least Significant Difference (LSD) test at the 5% significance level ($p < 0.05$).

The hedonic quality test conducted on the milk pudding included evaluations of color, texture, taste, and aroma, each assessed using a 3-point scale. The average values obtained from the hedonic quality analysis are presented in Table 2 below.

Table 2. Average Scores of Hedonic Quality Test on Milk Pudding

Treatments	Average Scores of Subjective Analysis			
	Color	Aroma	Taste	Texture
1	,00a	,00b	,67c	,80d
2	,67b	,97b	,60bc	,70cd
3	,17c	,73a	,30ab	,43bc
4	,50d	,73a	,23a	,27b
5	,87e	,67a	,17a	,83a

Note: Different letters following the mean values indicate a highly significant difference based on the Least Significant Difference (LSD) test at the 5% significance level ($p < 0.05$).

a. Color Hedonic Test

The analysis of variance (ANOVA) on the color preference of milk pudding with the addition of egg white and dragon fruit purée showed a statistically significant difference ($p < 0.05$). The average hedonic scores for color ranged



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from 2.90 to 4.33. The highest mean score for color preference was 4.33 (liked), found in Treatment 4 (P4), which included 25% addition or 175 grams of egg white and dragon fruit purée. The lowest mean score was 2.90 (disliked), observed in Treatment 1 (P1), which contained a 10% addition or 70 grams of egg white and dragon fruit purée.

b. Aroma Hedonic Test

The analysis of variance (ANOVA) on the aroma preference of milk pudding with the addition of egg white and dragon fruit purée showed no statistically significant difference ($p > 0.05$). The average hedonic scores for aroma ranged from 3.50 to 3.70. The highest mean score for aroma preference was 3.70 (liked), found in Treatment 3 (P3), which included 20% addition or 140 grams of egg white and dragon fruit purée. The lowest mean score was 3.50 (liked), observed in Treatment 1 (P1), with a 10% addition or 70 grams.

c. Taste Hedonic Test

The analysis of variance (ANOVA) on the taste preference of milk pudding with the addition of egg white and dragon fruit purée showed no statistically

significant difference ($p > 0.05$). The average hedonic scores for taste ranged from 3.23 to 3.80. The highest mean score for taste preference was 3.80 (liked), found in Treatment 4 (P4), which included 25% addition or 175 grams of egg white and dragon fruit purée. The lowest mean score was 3.23 (neutral), observed in Treatment 1 (P1), with a 10% addition or 70 grams.

d. Texture Hedonic Test

The analysis of variance (ANOVA) on the texture preference of milk pudding with the addition of egg white and dragon fruit purée showed no statistically significant difference ($p > 0.05$). The average hedonic scores for texture ranged from 3.50 to 3.93. The highest mean score for texture preference was 3.93 (liked), found in Treatment 4, which included 25% addition or 175 grams of egg white and dragon fruit purée. The lowest mean score was 3.50 (neutral), observed in Treatment 5, with a 30% addition or 210 grams.

e. Color Hedonic Quality

The analysis of variance (ANOVA) on the color hedonic quality of milk pudding with the addition of egg white and dragon fruit purée showed a statistically significant difference ($p < 0.05$). The

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average scores for color hedonic quality ranged from 1.00 to 2.87. The highest average score was 2.87 (purplish red), found in Treatment 5, which included 30% addition or 210 grams of egg white and dragon fruit purée. The lowest average score was 1.00 (pink), observed in Treatment 1, with a 10% addition or 70 grams.

f. Aroma Hedonic Quality

The analysis of variance (ANOVA) on the aroma hedonic quality of milk pudding with the addition of egg white and dragon fruit purée also showed a statistically significant difference ($p < 0.05$). The average scores for aroma hedonic quality ranged from 2.67 to 3.00. The highest average score was 3.00 (neutral), found in Treatment 1, which included 10% addition or 70 grams of egg white and dragon fruit purée. The lowest average score was 2.67 (neutral), observed in Treatment 5, with a 30% addition or 210 grams.

g. Taste Hedonic Quality

The analysis of variance (ANOVA) on the taste hedonic quality of milk pudding with the addition of egg white and dragon fruit purée showed a statistically significant

difference ($p < 0.05$). The average scores for taste hedonic quality ranged from 2.17 to 2.67. The highest average score was 2.67 (sweet), found in Treatment 1, which included 10% addition or 70 grams of egg white and dragon fruit purée. The lowest average score was 2.17 (slightly sweet), observed in Treatment 5, with a 30% addition or 210 grams.

h. Texture Hedonic Quality

The analysis of variance (ANOVA) on the texture hedonic quality of milk pudding with the addition of egg white and dragon fruit purée also showed a statistically significant difference ($p < 0.05$). The average scores for texture hedonic quality ranged from 1.83 to 2.80. The highest average score was 2.80 (chewy), found in Treatment 1, with a 10% addition or 70 grams of egg white and dragon fruit purée. The lowest average score was 1.83 (slightly chewy), observed in Treatment 5, which included 30% addition or 210 grams.

Protein and Antioxidant Test Results

Objective analysis was conducted to determine the protein content and antioxidant activity of milk pudding with

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the addition of egg white and dragon fruit purée, across five treatments with three replications each. The results of the analysis showed the average values as presented in Table 3.

Table 3. Average Values of Objective Analysis on Milk Pudding

Treatments	Average Scores of Objective Results	
	Protein Content (%)	Antioxidant Activity (ppm)
P1	1,96a	4186,017b
P2	2,33a	4261,064b
P3	2,45a	4254,689b
P4	2,47a	4382,710b
P5	2,62a	2371,424a

Note: Different letters following the mean values indicate a highly significant difference based on the Least Significant Difference (LSD) test at the 5% significance level ($p < 0.05$).

The protein content ranged from 1.96% to 2.62%, while antioxidant activity results ranged from 23,714.24 ppm to 43,827.10 ppm.

a. Protein Content

Based on the analysis of variance (ANOVA) for the protein content of milk pudding with the addition of egg white and dragon fruit purée, the results showed no significant difference ($p > 0.05$). The average protein content of the milk pudding ranged from 1.96% to 2.62%. The highest protein content was 2.62%, observed in treatment 5 with 30% (210 grams) of egg white and dragon fruit purée added. The lowest average protein content was 1.96%, found in treatment 1 with 10% (70 grams) addition.

b. Antioxidant Activity

Based on the analysis of variance for the antioxidant activity of milk pudding with the addition of egg white and dragon fruit purée, the results showed a significant difference ($p < 0.05$). The IC50 values for antioxidant activity ranged from 23,714.24 ppm to 43,827.10 ppm. The highest average IC50 value was 43,827.10 ppm in treatment 4 with 25% (175 grams) addition, while the lowest was 23,714.24 ppm in treatment 5

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with 30% (210 grams) of egg white and dragon fruit purée added.

Determination of the Best Treatment

This study determined the best treatment of milk pudding with the addition of dragon fruit purée and egg white based on the highest average notation from subjective (sensory) analysis. The analyzed data are presented in the following table:

Table 4. Mean Values of Hedonic Quality Test Results for Milk Pudding

Subjective Analysis	Treatment				
	1	2	3	4	5
Color	,90	,33	,00*	,33*	,71*
Aroma	,50*	,53*	,70*	,53*	,63*
Taste	,23	,30	,53	,80*	,63
Texture	,57*	,53*	,50*	,93*	,50*

Note: *Treatments showing significant differences based on statistical analysis (LSD test at $\alpha = 0.05$)

Based on the data analysis presented in the table, it can be observed that in terms of preference, panelists tended to favor the milk pudding in Treatment 4 (P4), which contained 25% or 175 grams of egg white and dragon fruit purée. However, based on hedonic quality assessment, panelists tended to rate Treatment 1 (P1) higher in terms of aroma, taste, and texture.

Objective analysis showed that Treatment 1 (P1) had the lowest protein content at 1.96% and an IC50 value of 41,860.17 ppm. In contrast, Treatment 4 (P4) had a higher protein content of 2.47% and an IC50 value of 43,827.10 ppm.

DISCUSSION

This study was an experimental research using a Randomized Complete Block Design (RCBD), consisting of 5 treatments and 3 replications. The purpose of this research was to determine the effect of adding egg white and dragon fruit purée on the characteristics of milk pudding, including hedonic attributes, hedonic quality, protein content, and antioxidant activity. The organoleptic evaluation was conducted for color, aroma, texture, taste, color quality, aroma quality, and texture



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quality of the milk pudding, involving 30 panelists from Bali Mandara General Hospital (RSUD Bali Mandara). The collected data were analyzed using ANOVA to identify significant differences between treatments. If significant differences were found, further analysis was carried out using the Least Significant Difference (LSD) test to determine which treatments had significant effects.

Organoleptic testing is an evaluation of the sensory attributes of a food material or product using human senses. This analysis includes the assessment of color, aroma, taste, texture, and overall acceptability. Meanwhile, the assessed hedonic quality characteristics included color, taste, aroma, and texture. The sensory quality of food materials is determined based on characteristics that arise from one or a combination of two or more properties that can be perceived by human senses (Pudjirahaju, 2018).

Subjective Analysis

a. Color and Color Quality

This study obtained the highest mean score for hedonic quality test of milk pudding color at 2.87 (purplish-red), found

in treatment 5 (P5) with the addition of 30% (210 grams) egg white and dragon fruit purée. Meanwhile, the highest mean score for hedonic color preference was 4.33 (liked), observed in treatment 4 (P4) with the addition of 25% (175 grams) egg white and dragon fruit purée.

An attractive pudding color can serve as the main appeal for consumers, especially in enhancing appetite and interest to try it. The addition of dragon fruit provides a vivid red color that creates a more appetizing and aesthetic appearance. The natural color from dragon fruit not only enhances the pudding's visual appeal but also offers a fresh and exotic impression. With its vibrant and appealing appearance, this pudding has the potential to be more favored by consumers due to its bright and tempting look (Noviyanti & Dalmayanti, 2024).

According to Aisyah et al. (2023), the red color in red dragon fruit originates from beta-carotene content, which can act as a natural food coloring agent. To utilize this distinctive color, red dragon fruit is processed into a purée. The use of purée is preferred as it provides an attractive reddish hue. Purée itself is a product made by

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blending or grinding fruits or vegetables into a smooth texture (Aisyah et al., 2023). Additionally, according to Ariyani et al. (2024), dragon fruit contains natural pigments called anthocyanins, which give red, purple, or blue coloration. The anthocyanin content in dragon fruit ranges from 28.7 to 55.6 mg per 100 grams (Ariyani et al., 2024).

b. Aroma and Aroma Quality

The highest average score for the hedonic quality test of milk pudding aroma was 3.00 (neutral), found in treatment 1 (P1) with the addition of 10% (70 grams) egg white and dragon fruit purée. Meanwhile, the highest average score for hedonic aroma preference was 3.70 (liked), observed in treatment 3 (P3) with the addition of 20% (140 grams) egg white and dragon fruit purée.

A study conducted by Adfar et al. (2022) found that the panelists' average evaluation of milk pudding aroma ranged from 2.2 to 3.28, which falls into the category of somewhat liked to liked. Treatment P1, which used a formulation of 75 g yogurt, 10 g egg, and 15 g mung bean flour, received the highest aroma preference score of 3.28. The presence of a

fishy smell in milk pudding is generally attributed to the use of relatively larger amounts of egg. Based on this, the quantity of egg white added affects the panelists' assessment of the pudding's aroma (Adfar et al., 2022).

c. Taste and Taste Quality

The highest average score for the hedonic quality test of milk pudding taste was 2.67 (sweet), found in treatment 1 with the addition of 10% (70 grams) egg white and dragon fruit purée. The highest average score for hedonic taste preference was 3.80 (liked), observed in treatment 4 with the addition of 25% (175 grams) egg white and dragon fruit purée. This study shows that increasing the amount of dragon fruit purée actually reduced the perceived sweetness of the product. This is likely due to the high water content in dragon fruit, which dilutes the sugar concentration, as well as the presence of other compounds such as fiber and organic acids that can influence the overall perception of sweetness.

Findings from a study by Kasmiyetti et al. (2021) support this result, where the addition of more than 20% dragon fruit juice resulted in a taste that was too sour and less preferred by panelists.

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This suggests that the more dragon fruit is used, the stronger the dominance of its sour flavor, thus diminishing the expected sweetness (Kasmiyetti et al., 2021). In addition, research by Budiandari & Nurbaya (2024) also found that heating can enhance the sweetness of dragon fruit. This indicates that in fruit-based product formulations, the processing method also plays an important role in determining the final taste (Budiandari & Nurbaya, 2024).

d. Texture and Texture Quality

The highest average score for the hedonic quality test of pudding texture was 2.80 (chewy), found in treatment 1 with the addition of 10% (70 grams) egg white and dragon fruit purée. The highest average score for hedonic texture preference was 3.93 (liked), observed in treatment 4 with the addition of 25% (175 grams) egg white and dragon fruit purée.

This study indicates that increasing the amount of dragon fruit purée and egg white in the pudding leads to a softer texture. This is due to the high water content in dragon fruit, so the more purée added, the higher the water content in the pudding mixture. A similar result was also found in a study on the addition of dragon

fruit purée to laklak by Ariyani et al. (2024), where a large amount of dragon fruit purée resulted in a softer texture due to the increased water content in the mixture (Ariyani et al., 2024).

Objective Analysis

a. Protein Content

The highest average protein content in the milk pudding was 2.62%, found in Treatment 5 with the addition of 30% (210 grams) egg white and dragon fruit purée. The lowest average was 1.96%, observed in Treatment 1 with the addition of 10% (70 grams) egg white and dragon fruit purée. Based on further analysis, Treatment 4 was identified as the best formulation based on subjective assessment, with a protein content of 2.47% per unit weight of the product. These findings suggest that protein content increases proportionally with the addition of egg white and dragon fruit purée.

Eggs are widely recognized as a high-quality source of protein, alongside milk. Their nutrient composition is comprehensive, including amino acids, carbohydrates, fats, vitamins, and minerals. The majority of protein in eggs is

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concentrated in the yolk, approximately 16.5%, while egg whites contain about 10.9% protein. Most of the fat content, however, is found in the yolk (around 32%), whereas the white contains only a minimal amount of fat. Therefore, egg whites serve primarily as a source of protein, while egg yolks contribute more significantly to the fat content (Adfar et al., 2022).

b. Antioxidant Content

The highest average antioxidant content in the milk pudding was 43,827.10 ppm, found in Treatment 4 with the addition of 25% (175 grams) egg white and dragon fruit purée. The lowest average was 2,371.24 ppm, observed in Treatment 5 with the addition of 30% (210 grams) egg white and dragon fruit purée. Following further analysis, Treatment 4 was also identified as the best formulation based on subjective evaluation.

The IC₅₀ value for Treatment 4 was 43,827.10 ppm. Theoretically, a higher IC₅₀ value indicates a lower antioxidant activity. This aligns with the theory presented by Fadhillah et al. (2021), which states that antioxidant activity can be measured through the IC₅₀ value. IC₅₀ represents the concentration required to

inhibit 50% of oxidation, with lower values reflecting stronger antioxidant activity (Fadhilah et al., 2021).

Previous research has shown that red dragon fruit contains higher levels of polyphenols compared to other dragon fruit species—approximately 86.13 ± 17.02 mg per 0.50 g of dried extract. This high polyphenol content contributes significantly to its antioxidant potential. The red dragon fruit extract contains 8.88 mg of antioxidant compounds, equivalent to the antioxidant capacity of vitamin C, in 600 grams of the fruit.

This study yielded varying IC₅₀ values, which may be attributed to the heating conditions during product preparation. This assumption is supported by the findings of Manuel et al. (2021), who stated that variations in IC₅₀ values could result from both differences in antioxidant content and the degradation of antioxidants at elevated temperatures during processing (Manuel et al., 2021). In addition, Suci & Husin (2020) observed inconsistent antioxidant activity values across treatments and concentrations, likely due to antioxidant degradation during processing. This degradation may inhibit the optimal

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extraction of antioxidant compounds and reduce their ability to donate hydrogen atoms for DPPH radical reduction (Suci & Husin, 2020).

The antioxidant activity test indicated that milk pudding with the addition of egg white and dragon fruit purée had an IC₅₀ value of 2,371.24 ppm. According to the criteria established by Indrawati et al. (2021), an IC₅₀ value < 50 ppm is classified as very strong, 50–100 ppm as strong, 100–150 ppm as moderate, and 151–200 ppm as weak. Therefore, an IC₅₀ value of 2,371.24 ppm is considered very weak, indicating low antioxidant activity.

Although the pudding demonstrated good sensory acceptability, its antioxidant potential remains limited. As a result, the product cannot yet be classified as a highly functional food with effective free radical-scavenging capacity. Further innovation is needed, such as the incorporation of additional antioxidant-rich ingredients, to improve its functional value.

Nutritional Value

Table 5. Nutritional Value of Milk Pudding with the Addition of Egg White and Dragon Fruit Purée per 100 Grams (Treatment 4)

No	Nutritional Component	Value per 100 gram
1	Energy	50,16 kcal
2	Protein	2,47 gram
3	Fat	1,76 gram
4	Carbohydrate	6,58 gram

Based on the hedonic assessment, Treatment 4 was identified as the best formulation, with a protein content of 2.47% per unit weight. Given that the portion weight is 100 grams, each serving of milk pudding contains 2.47 grams of protein.

According to the Indonesian National Standard (SNI, 1996), the quality requirements for snack bars include an energy content of 200–400 kcal and a minimum protein content of 25–50 grams per 100 grams of product. The milk pudding product developed with added egg white and dragon fruit purée contains 50.16

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kcal of energy and 2.47 grams of protein per 100 grams. When compared to the SNI standards, this product only meets approximately 12.5%–25% of the minimum energy requirement (200–400 kcal) and only 9.88%–9.9% of the minimum protein requirement (25–50 grams). Thus, the product still falls significantly below SNI standards in both energy and protein content.

According to the 2019 Indonesian Nutritional Adequacy Rate, the recommended protein intake for adults aged 30–49 is 65 grams for males and 60 grams for females. Therefore, one serving of this milk pudding provides approximately 3.8% of the daily protein requirement for men and 4.12% for women.

Theoretically, snacks should ideally contribute about 10% of the total daily nutritional requirement. Accordingly, to fulfill the role of an ideal snack, individuals would need to consume approximately two to three small portions of this milk pudding per day. Consumption should follow the principle of small, frequent portions, especially for cancer patients, to help gradually increase intake. Further development of the recipe may involve

adding other high-protein ingredients such as legumes, seeds, or high-protein milk to enhance its nutritional value.

A related study by Afiska et al. (2021) on red bean pudding showed that 100 grams (or one serving) of the product contained 2.29 grams of protein. That study focused on the use of red bean pudding for addressing anemia in adolescent girls. It was also noted that two portions of the pudding were insufficient as a snack for meeting nutritional needs, thus highlighting the importance of incorporating additional ingredients to improve protein content (Afiska et al., 2021).

CONCLUSION(S)

This study developed a milk pudding enriched with egg white and dragon fruit purée in five different treatments: 10%, 15%, 20%, 25%, and 30%. The formulations were evaluated using both subjective quality tests (organoleptic) and objective quality tests (protein content and antioxidant activity). The organoleptic test results showed that respondents generally rated the pudding's color, aroma, taste, and texture from neutral to favorable. Protein content ranged from

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1.96% to 2.62%, while antioxidant activity ranged from 23,714.24 to 43,827.10 ppm. The best formulation was found in Treatment 4 (25% addition), which provided 2.47 grams of protein per 100-gram serving. Based on these findings, it is recommended that further product development be carried out, particularly by incorporating other high-protein foods such as legumes and natural antioxidant sources. This would help improve the nutritional value while also enhancing the flavor profile and overall appeal of the product.

Conflict of Interest

The author(s) declare that they have no conflict of interest.

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