



Fiber content evaluation and consumer preference of broiler chicken dim sum enriched with wood ear mushrooms

Evaluasi kadar serat dan preferensi konsumen pada dim sum ayam broiler dengan penambahan jamur kuping

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Abstract

Broiler chicken (*Gallus domesticus*) dim sum is a popular food known for its diverse composition and low fiber content. To increase fiber content, ear mushrooms (*Auricularia sp.*) were added to the dim sum. This study aimed to determine the fiber content, panelists' preference, and the appropriate portion of broiler dim sum as a side dish. The experimental study involved four treatment levels and six replicates with each sample weighing 20 g. This study was conducted in January, 2024. The fiber content test used an enzymatic method, whereas the preference test used a hedonic test assessed by 30 panelists. Data analysis was performed using the Friedman and Wilcoxon tests, as well as one-way ANOVA. The results showed an increase in fiber content, with the highest fiber content found in sample X3 at 2,43 grams. There were differences in color and texture ($p < 0,05$), whereas there were no differences in taste and aroma ($p > 0,05$). Sample X2 is the preferred sample. Therefore, the recommended portion of broiler chicken dim sum (X2) as a comfort food for men and women aged 19-29 years is two pieces. In conclusion, the addition of ear mushrooms can significantly increase the fiber content and preference of broiler chicken dim sums.

Keywords: Dietary fiber, dim sum, snack, wood ear mushroom

Abstrak

Dim sum ayam broiler (Gallus domesticus) adalah makanan populer yang dikenal dengan beragam komposisi namun rendah serat. Untuk meningkatkan kadar seratnya, jamur kuping (*Auricularia sp.*) ditambahkan ke dalam *dim sum* tersebut. Penelitian bertujuan untuk mengetahui kadar serat, preferensi panelis, dan porsi yang tepat dari *dim sum ayam broiler* sebagai makanan selingan. Penelitian eksperimental melibatkan empat tingkat perlakuan dan enam ulangan, dengan setiap sampel seberat 20 gram. Penelitian telah dilaksanakan pada Januari 2024. Uji kadar serat menggunakan metode enzimatis, sedangkan uji preferensi menggunakan uji hedonic yang dinilai oleh 30 panelis. Analisis data menggunakan Uji Friedman dan Wilcoxon, serta ANOVA satu arah. Hasil, menunjukkan peningkatan dalam kadar serat dengan kadar serat tertinggi ditemukan pada sampel X3 sebesar 2,43 gram. Terdapat perbedaan pada warna dan tekstur ($p < 0,05$), sedangkan rasa dan aroma tidak menunjukkan perbedaan ($p > 0,05$). Sampel X2 adalah paling disukai. Oleh karena itu, porsi *dim sum ayam broiler (X2)* yang direkomendasikan sebagai makanan selinga untuk pria dan wanita berusia 19-29 tahun adalah 2 potong. Kesimpulan, penambahan jamur kuping dapat secara signifikan meningkatkan kadar serat dan preferensi terhadap *dim sum ayam broiler*.

Kata Kunci: Dim sum, jamur kuping, makanan selingan, serat pangan

Introduction

Fiber plays crucial role in maintaining health, preventing disease, and is an essential

component of the diet (Palupi et al., 2023). However, the average fiber consumption of Indonesians is only 10,5 grams per day, meeting only approximately one-third of the daily

requirement. Insufficient fiber intake can lead to health issues such as constipation and a shift from communicable to non-communicable diseases (Qomariyah et al., 2022).

Research by Azzahra et al. (2023), found that 94,4% of college students consume less fiber, with 6,64 times greater risk of experiencing constipation. Ardina & Sutanto (2022) reported that 65% of college students have low fiber intake. Mabruroh & Amareta (2018), showed that the average daily fiber intake among college students is only 10,72 grams, with those living in boarding houses consuming even less (9,5 grams) compared to those living in their own homes (12,4 grams). This low intake is attributed to a preference for high-sodium and high-fat foods but low in fiber, such as fried foods and snacks (Arieska & Herdiani, 2020), also high-sugar foods and drinks like candy and boba (Fitriana et al., 2022). To meet fiber and other nutrient needs, it is necessary to consume a variety of foods, as recommended by the balanced nutrition guidelines (Kementerian Kesehatan RI, 2014). Vertical food diversification, which focuses on developing postharvest products, is an effective approach for enhancing dietary variety.

Dim sum, a popular Chinese snack known for its savory taste and small, convenient portions, typically lacks fiber. Therefore, adding fiber-rich ingredients, such as wood ear mushrooms (*Auricularia sp.*), can enhance its nutritional value. According to the Indonesian Food Composition Table (2018), 100 grams of fresh wood ear mushrooms contain 5,1 grams of fiber. Research by Fengjuan et al. (2019), indicated that dietary fiber from wood ear mushrooms can alleviate constipation by stimulating intestinal peristaltic movements. Additionally, this fiber has been shown to possess antioxidant and hypocholesterolemia properties (Bandara et al., 2019). Wood ear mushrooms have a unique chewy and crunchy texture with a mild taste and aroma, making them an ideal additive to broiler chicken dim sum without altering its distinctive flavor. Widely cultivated in Indonesia, these mushrooms are readily available in traditional and modern markets (Lincoff, 2017).

This study aimed to increase the fiber content of broiler chicken dim sum by adding wood ear mushrooms, creating a practical, nutritious, and economically valuable snack. Based on the background above, this research

investigates the effect of adding wood ear mushrooms on the fiber content and organoleptic properties of broiler chicken dim sum.

Methods

The basic ingredients for making broiler chicken dim sum include broiler chicken thigh meat, wood ear mushrooms (*Auricularia sp.*), tapioca flour, domestic chicken eggs, ice cubes, and dim sum skin. The additional seasonings used were garlic, salt, sugar, pepper, mushroom stock, oyster sauce, sesame oil, and soy sauce. The tools required included a digital scale, food chopper, steaming pan, gas stove, basin, cutting board, knife, spatula, measuring spoon, brush, and plastic gloves.

This study employed an experimental method with four sample groups and six replicates. The four broiler chicken dim sum formulations were X_0 (0% wood ear mushrooms and 100% broiler chicken meat), X_1 (10% wood ear mushrooms and 100% broiler chicken meat), X_2 (20% wood ear mushrooms and 100% broiler chicken meat), and X_3 (30% wood ear mushrooms and 100% broiler chicken meat). This method aimed to determine the best formulation for broiler chicken dim sums with added wood ear mushrooms.

The dietary fiber content test was conducted at the Food Analysis Laboratory, Polytechnic of Jember, using an enzymatic method. The preference test was conducted at the Organoleptic Laboratory, Integrated Laboratory Health Science (ILHS) Building, University of Jember, in January 2024.

Dietary fiber test data were analyzed using the Friedman test, and if significant results were found, the Wilcoxon signed-rank test was used for further analysis. The preference test involved 30 untrained panelists, who were students at the Faculty of Public Health, University of Jember. Data were collected using a hedonic scale test with five assessment criteria: color, aroma, taste, and texture. Hedonic scale test data were analyzed using one-way analysis of variance.

Research ethics are a crucial requirement for ensuring the quality and value of research. This study adhered to health research ethics principles and societal rules, as evidenced by Ethics Approval No. 2324/UN25.8/KEPK/DL/2023.

Result and Discussion

Fiber Content

The fiber content of broiler chicken dim, with or without the addition of wood ear mushrooms, is presented in Figure 1.

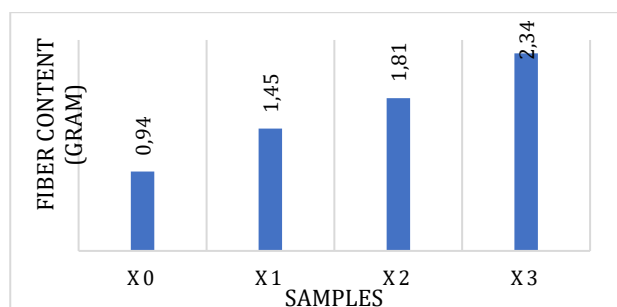


Figure 1. Average fiber content of broiler chicken dim sum

Based on the analysis results, the average fiber content in broiler chicken dim sums increased with the addition of wood ear mushrooms. The lowest average fiber content was found in dim sum without wood ear mushrooms (X_0) at 0,94 grams, while the highest was in dim sum with 30% wood ear mushrooms (X_3) at 2,34 grams.

The one-way ANOVA test showed that the p-value 0,000 was smaller than α (0,05), indicating a significant difference in the fiber content among the samples. Consequently, the analysis continued with the post-hoc Bonferroni test. The results are presented in Table 1.

Table 1. The results of post hoc bonferroni test

Samples	X_0	X_1	X_2	X_3
X_0		0,000*	0,000*	0,000*
X_1			0,000*	0,000*
X_2				0,000*
X_3				

The Post Hoc Bonferroni test results indicated significant differences among all sample pairs, confirming that adding wood ear mushrooms significantly increased the fiber content in broiler chicken dim sum. This finding is consistent with Purbowati et al. (2020), who reported that substituting chicken meat with oyster mushrooms significantly increased the fiber content in nuggets. Similarly, Anggriani et al. (2021) found that substituting broiler chicken meat with oyster mushrooms increased fiber content in tum. The fiber content in wood ear mushrooms is among the highest compared to

other mushroom types (Kementerian Kesehatan RI, 2018), supporting the conclusion that more wood ear mushrooms results in higher fiber content in dim sum.

Specifically, X_3 with the highest average fiber content had soluble and insoluble fiber contents of 0,57 grams and 1,77 grams, respectively. Conversely, X_0 had the lowest fiber content, with 0,24 grams of soluble fiber and 0,70 grams of insoluble fiber. Soluble dietary fiber binds fatty acids, slows gastric emptying, reduces sugar absorption, lowering LDL cholesterol, and regulates blood sugar. Insoluble fiber prevents constipation and speeds up waste excretion by softening stool, thus preventing constipation, hemorrhoids, and diverticulitis (Winarno, 2020).

Preference Test

The results of the preference tests are shown in Figure 2.

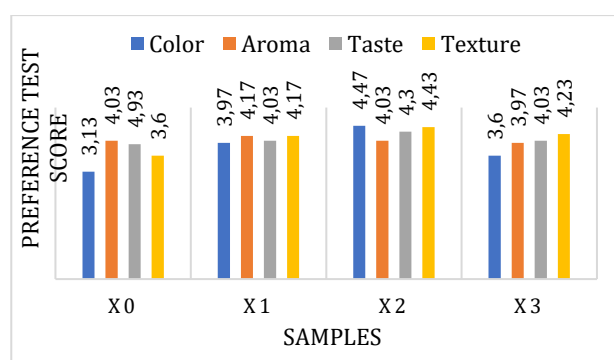


Figure 2. Average the preference test results of broiler chicken dim sum

Color

The color preference test showed that the sample with 20% wood ear mushrooms (X_2) was the most liked, with an average score of 4.47, whereas the sample without wood ear mushrooms (X_0) had the lowest score (3,13). The addition of wood ear mushrooms changed the color of the dim sum, with X_2 achieving an optimal balance between not too pale and not too dark. The dark brown color off wood ear mushrooms causes this change (Widyastuti & Tjokrokusumo, 2021).

The Friedman test results for color preference showed a p-value of 0,000, which was smaller than the α (0,05), indicating significant differences among the samples. The results of the Wilcoxon signed-rank test are presented in Table 2.

Table 2. Wilcoxon signed ranks test results for broiler chicken dim sum

Samples	X ₀	X ₁	X ₂	X ₃
X ₀		0,001*	0,000*	0,027*
X ₁			0,009*	0,034*
X ₂				0,000*
X ₃				

The Wilcoxon signed-rank test confirmed significant differences between all the pairs of samples. This finding is consistent with Azizah et al. (2019), who found significant differences in beef meatballs with added wood ear mushrooms due to the eumelanin pigment in the mushrooms (Zhang et al., 2022).

Aroma

The sample with 10% wood ear mushrooms (X₁) was the most liked, with an average score of 4,17, whereas the sample with 30% wood ear mushrooms (X₃) had the lowest score at 3,97. Friedman test results showed a p-value of 0,537, greater than α (0,05), indicating no significant difference in aroma preference among the samples.

This finding aligns with Hariadi & Rahimah (2017), who found no significant difference in the aroma of carrot tilapia fish balls with added oyster mushrooms, and Harmayani & Fajri (2021), who reported similar results for broiler chicken meatballs with wood ear mushrooms. The strong aroma of the spices used in the dim sum likely masked the subtle aroma of the wood ear mushrooms (Soeparno, 2015).

Taste

The taste preference test showed that the sample with 20% wood ear mushrooms (X₂) was the most liked, with an average score of 4,3, whereas the sample without wood ear mushrooms (X₀) had the lowest score at 3,93. Friedman test results showed a p-value of 0,629, greater than α (0,05), indicating no significant difference in taste preference among the samples.

This finding aligns with Handayani et al. (2016), who found no significant difference in the taste of meatballs with added oyster mushrooms. Wood ear mushrooms have mild taste, so the combination of spices used in making broiler chicken dim sum can disguise the taste of wood ear mushrooms (Soeparno, 2015). These spices include garlic, sugar, salt, pepper, mushroom stock, soy sauce, oyster sauce, and

sesame oil. Using a small amount of ear mushroom does not change the taste of the broiler chicken dim sum.

Texture

The texture preference test showed that the samples with 20% wood ear mushrooms (X₂) were the most liked, with an average score of 4,43, whereas the sample without wood ear mushrooms (X₀) had the lowest score at 3,6. The Friedman test results for texture preference showed a p-value of 0,000, which was smaller than the α (0,05), indicating significant differences among the samples. The results of the Wilcoxon signed-rank test are presented in Table 3.

Table 3. Wilcoxon signed ranks test results for broiler chicken dim sum

Samples	X ₀	X ₁	X ₂	X ₃
X ₀		0,006*	0,001*	0,027*
X ₁			0,197	0,757
X ₂				0,379
X ₃				

The Wilcoxon signed-rank test results confirm significant differences between the three pairs of samples, while the other three are not significant. This finding is consistent with Sidik et al. (2015), who found that the beef meatballs texture with added 20% of ear mushrooms are most liked. Research by Azizah et al. (2019) also found significant texture differences in beef meatballs with added wood ear mushrooms.

Wood ear mushrooms can affect the consistency of the batter during the process of making broiler chicken dim sums. The more wood ear mushrooms added, the more liquid the consistency of the batter. Wood ear mushrooms have a chewy texture, but they also contain a large amount of water; therefore, wood ear mushrooms cannot bind to other ingredients. The high water content in the batter causes its water-binding ability to be lower, so a large amount of water is released during cooking. It caused the gel that is formed to be weak, so the sum is softer Apriani et al. (2022). This also affected the texture of the four samples of broiler chicken dim sum; the more ear mushrooms added, the softer the texture.

In essence, adding fiber to food will make the texture firm because the soluble fiber content can mix with water and form a gel. This

gel can make food denser or sturdier (Permadi et al., 2015). The results of this study are inversely proportional to this theory; broiler chicken dim sum with the highest percentage of wood ear mushrooms added has a texture that tends to be soft. The fairly high water content of wood ear fungus is one of the reasons for this; however, this is also because the soluble fiber content in wood ear fungus tends to be low. This causes not too much gel to form; therefore, the texture of the dim sum becomes less solid as the number of wood ear mushrooms increases.

Portion Recommendation

The adequacy of fiber in broiler chicken dim sum with the addition of 20 % (X₂) wood ear mushrooms for adults aged 19-29 years is presented in Table 4 below:

Table 4. Fiber adequacy and recommended portions for broiler chicken dim sum

Gender	Adequacy of Fiber (%RDA)	Portion Recommendation (piece)
	19-29 years	19-29 years
Women	56,52	2
Men	48,91	2

The fiber content of broiler chicken dim sum with the addition of 20% wood ear mushroom was 1,81 grams/piece. The fiber adequacy in adult men (19-29 years) is 48,91%, with a recommendation to consume two pieces of broiler chicken dim sums as snacks. The adequacy in adult women (19-29 years) is 56,52%, with recommendations for consuming two pieces of broiler chicken dim sum as a snack weighing 20 g per piece.

Based on PERMENKES No. 28 2019, fiber needs recommendations based on the RDA for adults aged 19-29 years for women are 32 g/day and 37 g/day for men. The fiber needs for snacks (10%) were 3,2 grams for women and 3,7 grams for men. The results of the preference test indicated that the broiler chicken dim sum with the addition of as much as 20% wood ear mushrooms (X₂) was most liked by the panelists. Sample X₂ with added 20% of wood ear mushrooms, could meet the RDA of fiber needs by 56,52% in women and 48,91% in adult men aged 19-29 years who were consumed as snacks. To fulfill fiber needs according to the RDA, adult women aged 19-29 years are advised to

consume two pieces of broiler chicken dim sum with the addition of wood ear mushrooms, whereas adult men aged 19-29 years are advised to consume two pieces of broiler chicken dim sum with the addition of wood ear mushrooms.

Azzahra et al. (2023), found that 94,4% of students did not consume enough fiber and 41,2% of them experienced constipation. Meanwhile, only 25% of students who consumed sufficient fiber experienced constipation. The results of the analysis also showed that students who did not consume enough fiber had 6,64 times greater risk of experiencing constipation than those who consumed enough fiber. Research by Dewi et al. (2022), showed that regarding to the relationship between nutritional knowledge and fiber intake with functional constipation in nursing students at Udayana University, stated that the more adequate fiber intake, the lower the incidence of functional constipation in students. From the above studies, it can be concluded that fiber consumption affects the health of the digestive system, especially the incidence of constipation.

The limitation of this research is that there was no time lag or tools to neutralize the aroma in assessing the aroma from one sample to another. The dim sum was also formed manually, which caused the shape of the dim sum to be exactly the same to one another as when using a tool or mold. This could have increased the possibility of bias in this study.

Conclusion

The addition of 30% wood ear mushrooms (X₃) resulted in the highest average fiber content in the broiler chicken dim sum. An increase in the percentage of wood ear mushrooms corresponded to higher dietary fiber levels. Thus, it can be concluded that the addition of wood ear mushrooms significantly increases the fiber content of broiler chicken dim sum. However, the broiler chicken dim sum with 20% wood ear mushrooms (X₂) was the most preferred by the panelists. Consuming two pieces of this dim sum can meet the daily fiber requirements of snacks for women and men aged 19-29 years.

This study suggests that broiler chicken dim sum supplemented with wood ear mushrooms can be a practical nutritious alternative snack that meets daily fiber needs. Additionally, this innovation has the potential to

enhance the economic value of wood ear mushrooms by offering entrepreneurial opportunities. Further research is recommended to examine the macronutrient content, shelf life, and the addition of other ingredients to optimize broiler chicken diets for commercialization and market competition.

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