



Chemical characteristics and potential as functional food of seminyak leaves (*Champereia manillana*)

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Lily Restusari^{1*}, Muharni², Dewi Rahayu³, Nur Luqiana⁴

¹ Department of Nutrition, Poltekkes Kemenkes Riau, Riau, Indonesia.

E-mail: lily.restusari@pkr.ac.id

² Department of Nutrition, Poltekkes Kemenkes Riau, Riau, Indonesia.

E-mail: muharni@pkr.ac.id

³ Department of Nutrition, Poltekkes Kemenkes Riau, Riau, Indonesia.

E-mail: dewirahayu@pkr.ac.id

⁴ Department of Nutrition, Poltekkes Kemenkes Riau, Riau, Indonesia.

E-mail: nurluqiana@gmail.com

*Correspondence Author:

Department of Nutrition, Poltekkes Kemenkes Riau, Jln. Melur No. 103, Kecamatan Sukajadi, Kabupaten Pekanbaru, Provinsi Riau, 28122, Indonesia. E-mail: lily.restusari@pkr.ac.id

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Abstract

Seminyak (*Champereia manillana*) is a local food crop from Rokan Hulu, Riau, which is often consumed as a vegetable. Although traditionally used, valid scientific information regarding its nutritional composition is limited, which hinders its development as a functional food. This study aimed to analyze the proximate nutritional and fiber content of Seminyak leaves to evaluate their potential as functional food. The proximate content (moisture, ash, protein, fat, and carbohydrates) and fiber content were analyzed using AOAC 1993 and FOSS Analytical standard methods. The results were descriptively analyzed by presenting the values obtained from these tests. The analysis results showed that Seminyak leaves have a significant protein content of 4.41% and a high ash content of 2.37%. The fat content was very low (0%). The average values of other proximate nutrients included water (78.85%), carbohydrates (9.72%), and crude fiber (2.9%). With this nutritional profile, especially the high protein and mineral (ash) content and low fat content, Seminyak leaves have great potential as a source of vegetable protein and minerals and as a raw material for developing functional food products, which can contribute to local food diversification and food security.

Keywords: Proximate analysis, Seminyak leaves, *Champereia manillana*, Functional food.

Abstrak

Tanaman seminyak (*Champereia manillana*) adalah tanaman pangan lokal dari Rokan Hulu, Riau yang sering dikonsumsi sebagai sayuran. Meskipun digunakan secara tradisional, informasi ilmiah yang valid mengenai komposisi nutrisinya sangat terbatas, menghambat pengembangannya sebagai pangan fungsional. Penelitian ini bertujuan untuk menganalisis secara mendalam kandungan nutrisi proksimat dan serat daun seminyak sebagai dasar evaluasi potensi pangan fungsionalnya. Analisis kandungan proksimat (air, abu, protein, lemak, karbohidrat), dan serat dilakukan menggunakan metode standar AOAC 1993 dan Foss Analytical. Data hasil dianalisis secara deskriptif dengan menyajikan nilai dari hasil pengujian. Hasil analisis menunjukkan bahwa daun seminyak memiliki kandungan protein yang signifikan sebesar 4,41% dan kandungan abu yang tinggi sebesar 2,37%. Kandungan lemak tercatat sangat rendah, yaitu 0%. Secara rinci, nilai rata-rata kandungan nutrisi proksimat lainnya meliputi: air (78,85%), karbohidrat (9,72%), dan serat kasar (2,9%). Dengan profil nutrisi ini, terutama tingginya protein dan mineral (abu), serta rendahnya lemak, daun seminyak memiliki potensi besar sebagai sumber protein nabati, mineral, dan sebagai bahan baku untuk pengembangan produk pangan fungsional, yang dapat berkontribusi pada diversifikasi pangan lokal dan ketahanan pangan.

Kata Kunci: Proximate analysis, Seminyak leaves, *Champereia manillana*, Functional food

Introduction

Indonesia is known as a country with abundant mega-biodiversity, including various types of local food crops that have been used by the community for generations (Bappenas, 2024). The utilization of these resources not only contributes to dietary diversity but also plays a crucial role in supporting national food security through sustainable diversification of food consumption (Sabaha et al., 2025). These efforts are directly aligned with Sustainable Development Goals (SDGs) 2: ending hunger, achieving food security, and good nutrition (Ministry of Agriculture, 2021). Exploring local foods and product innovation are important strategies for mitigating food crises, diversifying nutrition, and creating a more resilient food system that benefits communities (Rahmatunisa et al., 2025).

One of the local food crops that grows naturally in Riau, particularly in the Rokan Hulu and Kampar Regencies, is seminyak leaves (*Champereia manillana*). This leaf is popularly processed into vegetables and is part of the daily menu of the local community in the Philippines. Although widely used in local cuisine, comprehensive scientific data on the nutritional characteristics of Seminyak leaves, particularly the proximate nutrition and fiber content, are still very limited (Kadarisman et al., 2023).

Research conducted abroad, such as in Thailand, has identified several important nutrients in these leaves, including calcium, potassium, and phosphorus, as well as bioactive compounds with antioxidant and anti-inflammatory potential (Usawakesmanee et al., 2025).

Meanwhile, studies in Indonesia have focused more on the phytochemical profile and pharmacological activity (e.g., as an antibacterial or antifungal agent), indicating the strong potential of bioactive compounds, but have not yet thoroughly examined the macronutrient profile as a food ingredient (Azman & Mat So'ad, 2024).

There have not been many studies related to valid and detailed proximate and fiber nutrient data for *Champereia manillana* varieties grown in the Rokan Hulu region of Riau. This data is crucial considering that the nutritional characteristics of plants can vary depending on their geographical location. *The novelty* of this study lies in its main

focus on the macronutrient profile (proximate and fiber) specific to the Riau variety as a first step in exploring functional food ingredients, which distinguishes it from previous pharmacological studies. The significance of this research is important because it provides basic scientific data on the biochemical or nutritional potential of Seminyak leaves, particularly their protein and fiber content, which could ultimately open up opportunities for the development of functional food products and increase the economic value of local crops.

Based on this background, the main objective of this study was to analyze and describe the water, ash, protein, fat, carbohydrate, and fiber content of Seminyak leaves (*Champereia manillana*) originating from Rokan Hulu Regency, Riau, as basic data for the exploration and development of local functional food products with economic value.

Methods

This study employed a quantitative descriptive research design to describe and measure the proximate content of Seminyak leaves (*Champereia manillana*) using laboratory tests.

Materials and Instruments

The sample used was Fresh Seminyak leaves were obtained from Rokan Hulu Regency, Riau Province, and collected in April 2025. A total of 1000 g of samples were collected to ensure an adequate representation.

The main instruments used included analytical scales (± 0.0001 g), a drying oven (105°C), a furnace (550°C), a desiccator, a Kjeldahl distillation apparatus for protein analysis, a Soxhlet extractor for fat analysis, a Fibertec apparatus (for fiber analysis), and a UV-Vis spectrophotometer.

Analysis Procedure

Moisture and ash content analyses were performed according to the AOAC 1993 method. For the moisture content, the sample was oven-dried at 105°C until a constant weight was achieved. The ash content was determined by burning the sample in an incinerator at 550°C.

The protein, fat, and fiber contents were analyzed using the Foss Analytical method. The protein content was determined using the

Kjeldahl method, fat content using Soxhlet extraction, and fiber content using Fibertec analysis.

The carbohydrate content was calculated using the difference method, which involved subtracting the total percentages of water, ash, protein, and fat from 100. All proximate and fiber analyses were performed using AOAC 1993 and Foss Analytical standard methods. Testing was performed once (single/single) for each of the parameters.

Data Analysis

The data obtained from the proximate test were analyzed descriptively and quantitatively by

comparing the proximate test values of Seminyak leaves (*Champereia manillana*). These data will be used to describe the nutritional composition of Seminyak leaves and then compared with literature data or standard limit values to interpret their functional-food potential.

Result and Discussion

The results of the proximate and fiber analysis of seminyak leaves (*Champereia manillana*) show the nutritional composition as summarized in Table 1. Laboratory test results indicated that fresh Seminyak leaves have a better composition.

Table 1. Nutritional Composition of Seminyak Leaves and Melinjo Leaves

Parameter	Seminyak Leaves	Melinjo Leaves	Others (Comparative Vegetables)
Water content	78.85	83	70–90
Ash content (%)	2.37	9.4	± 1
Protein content (%)	4.41	5	<i>Champereia manillana</i> : 4.73% Fresh vegetables: 0.5–2.5%
Fat content (%)	0	1.30	<i>Champereia manillana</i> : 0.61%; Fresh vegetables: 0.1–1%
Carbohydrates (%)	9.72	21.3	<i>Champereia manillana</i> : 7.32%
Fiber content (%)	2.9	10.3	Spinach: 2.8%; Water spinach: 2%; Cassava: 1.9%

Source: (Lilipaly, 2023) (Pratiwi et al., 2017) (Nurainy, 2018) (Usawakesmanee et al., 2025) (Ministry of Health, 2019).

Moisture Content

The results of this study show that the water content of fresh Seminyak leaves (*Champereia manillana*) is 78.85%. This value is within the general range of water content in fresh vegetables (70-90%) (Lilipaly et al., 2023). Although the moisture content of these Seminyak leaves indicates a free water content that limits shelf life (Nasria et al., 2024), high moisture content can shorten shelf life by supporting microbial growth.

However, the dry matter percentage of 21.14% confirms the high concentration of solid nutrients, such as proteins, carbohydrates, and minerals, which will be discussed further.

Ash Content

The ash content of Seminyak leaves was 2.37%, which is significant and even higher than the average ash content of vegetables (1%) (Pratiwi et al., 2017). Although lower than that of melinjo leaves (9.4%), this high ash content is a strong indicator of an abundant inorganic mineral content (Widarto et al., 2021).

The high ash content provides a strong justification (functional nutritional value) for using Seminyak leaves as a source of important minerals such as calcium, potassium, phosphorus, and iron (Fe) (Usawakesmanee et al., 2025). This implies that the use of Seminyak leaves in the diet can help address mineral deficiencies, such as osteoporosis and anemia, thereby supporting their functional potential for fortification into other food products (Nasria et al., 2024).

Protein Content

The crude protein content of the Seminyak leaves was 4.41%. This figure is relatively high compared to the average protein content in fresh vegetables, which generally ranges from 0.5% to 2.5% (Nurainy, 2018). The high protein content indicates that Seminyak leaves are not just a complementary vegetable but have the potential to be a significant source of plant-based protein.

Although its protein content is slightly lower than that of melinjo leaves (5%) and Thai

seminyak leaves (4.73%), this 4.41% content indicates the potential of Riau variety seminyak leaves as an important source of vegetable protein, supported by the presence of amino acids and phosphorus as protein-forming compounds (Yunita et al., 2022). Therefore, the higher the protein content of a food ingredient, the better its quality and nutritional value are.

This high protein content has major implications for public nutrition, especially in areas facing malnutrition and stunting challenges. Seminyak leaves can be an economical and easily accessible local food alternative for increasing daily protein intake. The utilization of Seminyak leaves through further processing, such as into fortified flour or plant-based supplements, can be an innovative strategy to create functional food products that are not only healthy but also have economic value. Thus, this study not only provides descriptive data but also paves the way for practical applications that can contribute to strengthening food security and improving public health.

Fat Content

Analysis showed that the fat content of Seminyak leaves (*Champereia manillana*) was 0%. This figure is much lower than the fat content found in Seminyak leaf varieties in Thailand (0.61%) and melinjo leaves (1.30%). Although the fat content in vegetables is generally low, ranging from 0.1% to 1%, these findings confirm that Seminyak leaves have a fat content of almost zero (Nurainy, 2018).

Vegetables have very low fat content and can be said to contain almost no fat. Although vegetables are generally low in fat, their fat content varies depending on the type of vegetable. However, this does not imply that all types of vegetables have very low fat content. Vegetables that are low in fat include green vegetables such as spinach, kale, lettuce, mustard greens, and broccoli (Nasria et al., 2024).

The extremely low fat content (0 %) in Seminyak leaves makes them ideal for cardiovascular health. Additionally, lutein and beta-carotene, which have been identified in this plant (Musa et al., 2022), are fat-soluble carotenoids, and their presence alongside the low fat profile further strengthens the claim that seminyak leaves are cardioprotective. This is particularly important for health, as fat-free or

low-fat foods offer numerous benefits, such as helping control cholesterol and maintain heart health. This study highlights Seminyak leaves as an ideal food for a healthy diet, especially for individuals at risk of or managing cardiovascular diseases. By incorporating Seminyak leaves into their diet, people can take preventive measures to maintain their heart health.

Carbohydrate Content

The carbohydrate content was 9.72%. Compared to previous research, Seminyak leaves from Thailand had a carbohydrate content of 7.32% (Kongkachuichai et al., 2015). Meanwhile, based on the Indonesian Food Composition Table (TKPI), the carbohydrate content in melinjo leaves is higher at 21.3% (Ministry of Health of the Republic of Indonesia, 2019). In general, green vegetables contain complex carbohydrates with long molecular chains that take longer to digest than simple carbohydrates. The complex carbohydrates in Seminyak leaves are polysaccharides. Polysaccharides include starch, which is usually lower in green vegetables than in grains (Rico et al., 2024).

Complex carbohydrates (polysaccharides) in green vegetables can help maintain stable blood sugar levels, provide sustained energy, and are nutrient-rich. Green vegetables play an important role in maintaining digestive health and reducing the risk of chronic diseases (Widiastuti et al., 2024).

Fiber Content

Research has shown that the fiber content of Seminyak leaves (*Champereia Manillana*) is 2.9%. The fiber content of Seminyak leaves is almost the same as that of other green vegetables, such as spinach (2.8%), kale (2%), and cassava leaves (1.9%). Seminyak leaves provide health benefits when consumed in adequate amounts. Thus, Seminyak leaves can play a role in improving digestive health, reducing the risk of heart disease, controlling blood sugar, meeting the body's fiber needs, and reducing the risk of other diseases (Yunita et al., 2022).

Nutritional Implications and Development

Overall, these findings not only provide descriptive data on the nutritional composition of Seminyak leaves but also highlight their great potential as a functional food. The high protein and mineral content can be utilized to develop

value-added processed products, such as seminyak leaf flour, for use as a raw material in biscuits, cereals, or functional beverages. This effort will increase the economic value of Seminyak leaves and their acceptance in the community while contributing to the diversification of local foods and strengthening national food security.

Conclusion

The analysis of the nutritional content of Seminyak leaves (*Champereia manillana*) revealed that the prominent potential nutrients are protein and ash content, with very low fat content. This significant protein content makes seminyak leaves a potential source of vegetable protein. This nutritional profile, which is high in protein and minerals (ash) and low in fat, provides strong scientific justification for the potential of Seminyak leaves as a *functional food*, which is ideal for supporting heart health and body mineralization.

Recommendations: This study has provided valid basic scientific data; however, to optimize its potential applications, it is recommended that further analysis be conducted to specifically identify the mineral content and bioactive compounds, as well as product formulation studies and food safety testing to increase economic value and public acceptance.

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