

Potential of Mung Beans in Obesity Management: A Narrative Literature Review

Potensi Kacang Hijau pada Penderita Obesitas: Tinjauan Literatur Naratif

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ABSTRACT

Obesity is a growing global health concern, associated with various metabolic disorders and a reduced quality of life. The aim of this narrative literature review was to summarise the current scientific evidence regarding the potential of mung beans (*Vigna radiata*) as an alternative snack for managing obesity. Articles published between 2020 and 2025 were identified in the PubMed, ScienceDirect, MDPI, and Google Scholar databases. Following a screening process based on predefined inclusion and exclusion criteria, six articles were included in the final analysis. The reviewed studies suggest that mung beans have considerable potential to support weight management and metabolic health thanks to their high dietary fibre, plant-based protein, and bioactive compound content. These components contribute to increased satiety, improved lipid profiles, enhanced insulin sensitivity, and better glucose regulation. Mung bean-based products, including whole beans, flour-based foods, extracts, and functional snack formulations, may provide healthier alternatives to conventional snacks. However, variations in study design, intervention form, and outcome measurements limited direct quantitative comparisons between studies. Overall, mung beans show promise as an affordable, functional food for obesity management, although further clinical studies are required to determine the optimal dosage and frequency of consumption, as well as long-term effectiveness.

Keywords: Mung beans, obesity, functional food, dietary fibre, metabolic health

ABSTRAK

Obesitas merupakan masalah kesehatan global yang terus meningkat dan dikaitkan dengan berbagai gangguan metabolisme serta penurunan kualitas hidup. Tinjauan literatur naratif ini bertujuan untuk mensintesis bukti ilmiah terkini mengenai potensi peran kacang hijau (*Vigna radiata*) sebagai camilan alternatif dalam pengelolaan obesitas. Artikel yang diterbitkan antara tahun 2020 dan 2025 diidentifikasi melalui basis data PubMed, ScienceDirect, MDPI, dan Google Scholar. Setelah proses penyaringan berdasarkan kriteria inklusi dan eksklusi yang telah ditentukan, enam artikel dimasukkan dalam analisis akhir. Studi yang ditinjau menunjukkan bahwa kacang hijau memiliki potensi yang cukup besar untuk mendukung pengelolaan berat badan dan kesehatan metabolisme karena kandungan serat makanan, protein nabati, dan senyawa bioaktifnya yang tinggi. Komponen ini berkontribusi pada peningkatan rasa kenyang, peningkatan profil lipid, peningkatan sensitivitas insulin, dan regulasi glukosa yang lebih baik. Produk berbasis kacang hijau, termasuk kacang utuh, makanan berbasis tepung, ekstrak, dan formulasi camilan fungsional, dapat memberikan alternatif yang lebih sehat daripada camilan konvensional. Namun, variasi dalam desain studi, bentuk intervensi, dan pengukuran hasil membatasi perbandingan kuantitatif langsung antar studi. Secara keseluruhan, kacang hijau menunjukkan potensi sebagai makanan yang terjangkau dan fungsional untuk pengelolaan obesitas, meskipun studi klinis lebih lanjut diperlukan untuk menentukan dosis optimal, frekuensi konsumsi, dan efektivitas jangka panjang.

Kata Kunci: Kacang hijau, obesitas, pangan fungsional, serat pangan, kesehatan metabolik

Article Info:

Received: 13 April 2026 | Revised form: 15 April 2026 | Accepted: 19 June 2026 | Published online: June 2026



INTRODUCTION

Obesity is a complex, multifactorial disease characterised by excessive fat accumulation that negatively affects overall health. According to the World Health Organization (WHO), it is defined as abnormal or excessive fat accumulation that poses health risks and is typically indicated by a body mass index (BMI) of 30 kg/m² or higher. Those with BMI values between 25.0 and 29.9 kg/m² are categorised as overweight. The global prevalence of obesity has risen significantly in recent years, increasing by approximately 40.3% between 2021 and 2023. This growing trend has contributed to the increasing prevalence of non-communicable diseases, including diabetes mellitus, cardiovascular disease (CVD), metabolic syndrome (MetS), chronic kidney disease (CKD), hyperlipidaemia, hypertension, non-alcoholic fatty liver disease (NAFLD), and certain cancers (1). Obesity occurs when energy intake exceeds energy expenditure, resulting in excessive fat accumulation in adipose tissue.² In addition to unhealthy dietary patterns and physical inactivity, obesity is influenced by genetic, environmental, psychological, and social factors. Beyond its physical consequences, obesity significantly reduces quality of life, limiting individuals' ability to perform daily activities and increasing long-term health risks.³⁻⁵

At the national level, Indonesia is experiencing a similar trend of increasing obesity prevalence, driven by shifts in dietary patterns and lifestyle behaviours. The growing consumption of high-calorie, low-fibre foods combined with reduced physical activity has intensified the burden

of obesity as a public health concern. This highlights the urgent need for nutritional interventions that are effective, accessible, and sustainable, and that can be easily adopted by the community. One promising approach is utilising functional foods derived from local ingredients that are both nutritionally beneficial and culturally acceptable.^{6,7}

Snacking has become an increasingly important part of modern dietary behaviour. For people who are obese, changing what they snack on is often considered more feasible than changing their entire eating pattern. Healthy snacks that are high in fibre and protein may help to improve satiety, reduce excessive calorie intake, and support long-term weight management. Therefore, finding nutritious, locally available snack alternatives is an important obesity prevention and management strategy. Although mung beans are widely available and culturally accepted in Indonesia, research into their use as functional snacks for obesity management is limited. Their affordability and accessibility make them particularly suitable for sustainable dietary interventions in developing countries.

Mung beans (*Vigna radiata*) are a traditional Indonesian food and are known for their high nutritional value. They are rich in dietary fibre, particularly insoluble fibre such as cellulose, hemicellulose, and pectin, which play an important role in maintaining digestive health, regulating metabolism, and facilitating bowel movements.⁸ Adequate fibre intake can reduce the absorption of fat and sugar in the digestive tract, thereby lowering the risk of weight gain. Additionally, fibre slows



digestion and prolongs satiety, helping to reduce excessive calorie intake.⁹ Mung beans are also a significant source of plant-based protein, which contributes to satiety through hormonal mechanisms that regulate appetite.¹⁰ The combination of their high fibre and protein content makes mung beans a promising dietary component for weight management and obesity prevention. Furthermore, consuming them has been linked to improved insulin sensitivity, better glycemic control, and lower cholesterol levels, all of which are key in reducing obesity-related complications.^{9,11,12}

Although numerous studies have examined the nutritional composition and health benefits of mung beans, there is little evidence regarding their specific role in managing obesity through serving as an alternative snack. Existing studies vary considerably in terms of the form of intervention, outcome measures, and target populations. Most studies focus on individual nutritional components rather than evaluating mung beans as practical snack products that can be incorporated into daily dietary habits. Therefore, a comprehensive synthesis of the current evidence is required.

This review is novel in that it integrates evidence related to satiety regulation, glucose metabolism, lipid metabolism, bioactive compounds, processing methods, and functional food development, with the aim of providing a broader understanding of the potential role of mung beans in obesity management.

This narrative literature review, therefore, aims to synthesise and evaluate the current scientific evidence regarding the potential of mung

beans as an alternative snack for supporting obesity management and metabolic health.^{13,14}

MATERIALS AND METHODS

This study employed a narrative literature review approach. Articles were retrieved from the PubMed, ScienceDirect, MDPI, and Google Scholar databases using a combination of keywords, including 'mung bean', 'Vigna radiata', 'obesity', 'weight management', 'functional food,' and 'dietary fibre'. Only articles published in English between 2020 and 2025 were considered.

The inclusion criteria consisted of three categories: (1) articles discussing mung beans and obesity-related outcomes; (2) studies involving metabolic health, satiety, lipid metabolism, or glucose regulation; and (3) review articles, systematic reviews, or experimental studies. Articles were excluded if they were duplicate publications, had inaccessible full texts, were not written in English, or were unrelated to obesity or metabolic health.

The literature selection process comprised four stages: identification, screening, eligibility assessment, and inclusion. As shown in Figure 1, the initial literature search identified 78 records from the selected databases. After removing 13 duplicate records, 65 articles remained for title and abstract screening. A total of 47 articles were excluded because they did not meet the inclusion criteria. Eighteen full-text articles were then assessed for eligibility, and 12 were excluded due to insufficient relevance to obesity management, lack of full-text availability, or failure to meet the predefined inclusion criteria. Ultimately, six studies



were included in the final review and underwent further analysis to evaluate the potential role of mung beans in obesity management.

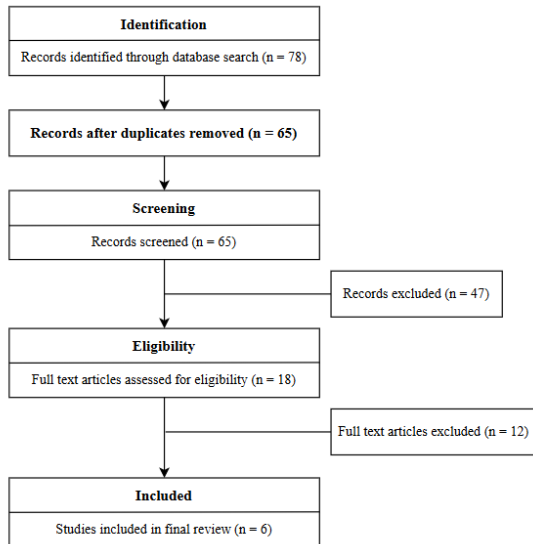


Figure 1. Flow Diagram of Literature Selection Process

The focus of the data extraction was on the study design, the characteristics of the interventions, the forms of mung bean utilisation and the obesity-related outcomes. The findings were synthesised narratively in order to identify common themes, strengths, and limitations, as well as research gaps concerning the role of mung beans in obesity management.^{2,15,16}

RESULTS

The final analysis included six studies that met the predefined inclusion criteria. The selected articles were review articles and systematic reviews focusing on dietary fibre, bioactive compounds, antinutritional factors, processing methods, and the metabolic health effects associated with mung bean consumption. While the studies differed in their research design and outcome measures, they all reported positive effects of mung beans on satiety,

glucose regulation, lipid metabolism, and overall metabolic health. Overall, the findings consistently showed that mung beans have significant potential to support weight management and improve metabolic parameters associated with obesity.

The characteristics of the included studies varied in terms of their research focus, ranging from dietary fibre mechanisms and bioactive compounds to antinutritional factors and metabolic health effects. Several studies emphasised the role of dietary fibre in regulating appetite, reducing energy intake, and improving digestion important factors in controlling body weight. Additionally, bioactive compounds found in mung beans were reported to contribute to improved lipid metabolism, enhanced glucose regulation, and reduced inflammation.

Across the analysed studies, mung bean consumption was shown to consistently improve key metabolic indicators. These included reductions in blood glucose levels, improved insulin sensitivity, and better lipid profiles characterised by decreased cholesterol and triglyceride levels. Furthermore, mung beans were shown to have hypoglycaemic and hypolipidaemic effects, which are essential in preventing and managing obesity-related complications. The presence of fibre and plant-based protein in mung beans also plays an important role in increasing satiety and supporting energy balance.

In addition to their metabolic benefits, several studies have emphasised the importance of processing methods and antinutritional factors in determining the effectiveness of mung beans as a dietary intervention. It was found that proper processing techniques reduce antinutritional



components and enhance nutrient bioavailability, thereby maximising the health benefits of mung beans. Mung bean-based products can be produced in a variety of forms, such as roasted mung beans, mung bean porridge, flour-based biscuits, protein-enriched snack bars, and beverages. Compared with conventional commercial snacks, which are often high in sugar, sodium, and saturated fat, mung bean-based snacks contain more dietary fibre and plant-based protein, which may enhance satiety and support metabolic health. However, current evidence is insufficient to determine the optimal

serving size and frequency of consumption required to achieve specific obesity-related outcomes. Therefore, further clinical studies are needed to establish evidence-based recommendations for mung bean snack consumption.

A summary of the characteristics and main findings of the selected studies is presented in Table 1. Although all of the included studies reported positive findings regarding the nutritional and functional properties of mung beans, the evidence remains heterogeneous.

Table 1. Extraction Results

Author(s) and Year	Research Design	Form/Aspect of Mung Bean Studied	Main Findings	Limitation
Akhlaghi (2024)	Review article	Dietary fiber and appetite regulation	Dietary fiber increases satiety, reduces energy intake, and supports weight management through appetite regulation mechanisms.	Does not specifically evaluate mung bean-based interventions.
Alahmari (2024)	Review article	Dietary fiber and metabolic health	Fiber intake improves lipid profiles, reduces inflammation, and supports prevention of obesity-related diseases such as diabetes and CVD.	Findings are based on dietary fiber in general, not exclusively mung beans.
Pokharel et al. (2024)	Review article	Processing methods and nutritional quality of mung beans	Processing methods improve digestibility, modify fiber composition, and enhance the functional value of mung beans.	Does not directly assess obesity-related outcomes.
Narale et al. (2024)	Review article	Antinutritional factors in mung beans	Reduction of antinutrients improves nutrient bioavailability and supports the functional food potential of mung beans.	Focuses on nutrient utilization rather than obesity management.
Karami et al. (2025)	Systematic review	Bioactive compounds and functional food applications	Bioactive compounds in mung beans improve metabolic health and may reduce obesity related risk factors.	Limited clinical evidence in human populations.
(Huang et al., 2024)	Experimental study (diabetic rat model)	Hypoglycemic and hypolipidemic effects	Mung bean water supplementation significantly reduced plasma glucose, total cholesterol, free fatty acids, and oxidative stress markers while improving glucose and lipid metabolism in diabetic rats.	Evidence largely derived from experimental studies.



The reviewed studies differed in terms of their research design, the focus of their interventions, and their outcome measures. Most studies emphasised dietary fibre, bioactive compounds or nutrient bioavailability rather than direct obesity-related outcomes. Furthermore, the limited amount of clinical evidence in human populations restricts our ability to draw firm conclusions about the effectiveness of mung bean-based snacks in managing obesity. Overall, the included studies demonstrated that the potential benefits of mung beans in obesity management are mainly due to their dietary fibre, plant-based protein and bioactive compound content. However, the evidence remains heterogeneous because the studies focused on different aspects of mung beans and used different outcome measures. Most studies evaluated nutritional and metabolic mechanisms rather than direct obesity-related outcomes in human populations. Therefore, although the findings suggest promising benefits, further clinical studies are needed to establish stronger evidence regarding the effectiveness of mung bean-based snacks in obesity management.

Overall, the reviewed studies consistently demonstrated the potential benefits of mung beans in supporting the management of obesity through various mechanisms, such as regulating appetite, improving lipid metabolism and glucose regulation, and enhancing nutrient bioavailability. However, the available evidence is heterogeneous due to differences in the studies' research design, intervention focus, and outcome measures. Most studies examined nutritional and metabolic mechanisms rather than direct obesity-related

outcomes in human populations. Therefore, while the findings suggest potential benefits, further clinical research is required to provide stronger evidence of the effectiveness of mung bean-based snacks in managing obesity.

DISCUSSION

Mung beans (*Vigna radiata*) are widely recognised as a nutrient-dense food that can support weight management and improve metabolic health, particularly in obese individuals. The findings of this study suggest that mung beans have beneficial effects due to their dietary fibre content. Dietary fibre plays a central role in promoting satiety and reducing overall energy intake by slowing gastric emptying and prolonging digestion. This mechanism contributes to a longer feeling of fullness and helps prevent excessive calorie consumption.⁹ Additionally, fibre reduces the absorption of lipids and glucose in the digestive tract, thereby supporting better weight control and metabolic stability. Previous studies have also demonstrated that adequate fibre intake is associated with improved lipid profiles, reduced inflammation, and a lower risk of obesity-related diseases, such as cardiovascular disease and diabetes.¹¹ These findings highlight the importance of incorporating fibre-rich foods, such as mung beans, into dietary strategies aimed at preventing and managing obesity.

As well as fibre, mung beans contain several bioactive compounds, including vitexin, isovitexin, flavonoids, phenolic compounds and antioxidant peptides. These compounds have been shown to enhance insulin sensitivity, regulate blood glucose



levels and reduce oxidative stress and inflammation, which are key underlying factors of obesity and its associated complications.^{13,16} The hypoglycaemic and hypolipidaemic effects identified in previous studies further support the role of mung beans in maintaining metabolic homeostasis, particularly in individuals with impaired glucose and lipid metabolism.¹⁸

In addition, the plant-based protein content of mung beans helps to regulate appetite through hormonal mechanisms that influence satiety. It is well known that protein intake stimulates the release of satiety-related hormones, thereby reducing hunger and supporting energy balance. The combined effect of fibre and protein creates a synergistic impact that enhances the effectiveness of mung beans as a dietary component for weight management.¹⁹

Another important factor influencing the effectiveness of mung beans is the processing method. Processing techniques can significantly impact the nutritional composition and bioavailability of nutrients. Studies have shown that appropriate processing methods can reduce antinutritional factors and improve nutrient absorption, thereby enhancing the overall functional value of mung beans.^{8,12} This highlights the importance of optimising food processing techniques, particularly for the development of mung bean-based products, such as alternative snacks.

Mung bean-based snacks can be produced in various forms, such as roasted mung beans, mung bean porridge, protein-enriched snack bars, flour-based biscuits, and beverages. Compared with

conventional commercial snacks, which are generally high in sugar, sodium and saturated fat, mung bean-based products provide a higher fibre and plant-based protein content, which could offer greater satiety and metabolic benefits. However, current evidence remains insufficient to establish the optimal serving size and frequency of consumption required to achieve specific obesity-related outcomes.

From a public health perspective, mung beans are a promising functional food that is accessible and culturally acceptable, particularly in developing countries such as Indonesia. Their affordability and availability make them a practical option for large-scale dietary interventions aimed at reducing obesity prevalence. Furthermore, developing mung bean-based snacks that align with modern dietary patterns provides a convenient, healthier alternative that can be integrated into daily consumption habits.¹³

However, despite these promising findings, it is important to acknowledge that most existing studies focus on the general nutritional properties of mung beans and on experimental evidence rather than on their direct application in real-world dietary interventions. This indicates a need for further research, particularly well-designed clinical trials and intervention-based studies, to evaluate the effectiveness of mung beans as a primary ingredient in alternative snack products for obese populations. Such studies are essential to strengthen the evidence base and support the implementation of mung bean-based dietary strategies in obesity management.¹⁸



CONCLUSIONS AND SUGGESTIONS

Mung beans show great promise as a functional food for managing obesity due to their content of dietary fibre, plant-based protein, and bioactive compounds. Current evidence suggests they have beneficial effects on satiety, glucose regulation, lipid metabolism, and overall metabolic health. However, the available evidence is predominantly derived from reviews and experimental studies, and clinical evidence in humans remains limited. Therefore, the effectiveness of mung bean-based snack products for obesity management requires validation through clinical investigations.

Further research is recommended, particularly randomised controlled trials involving human participants, to determine the optimal dosage and frequency of consumption of mung bean-based snack products, as well as their effectiveness and long-term safety. Future studies should also explore developing innovative, standardised mung bean snack formulations that are affordable, culturally acceptable and suitable for large-scale public health interventions aimed at preventing and managing obesity.

CONFLICT OF INTEREST

The author declares that there are no conflicts of interest regarding the publication of this manuscript. This study was conducted independently, and the presented data have not been influenced by any financial, personal, or institutional relationships that could be perceived as a potential conflict of interest.

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