



## The Effect of Consumption of Boiled Halaban Leaves (*Vitex Pinnata*) Water against Changes in Glucose Levels in Blood in Diabetes Mellitus Patients

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### ORIGINAL ARTICLE

#### ABSTRACT

Diabetes is a serious chronic condition that occurs due to the pancreas's inability to produce insulin in sufficient quantities or because the body cannot effectively use the insulin it produces. In general, the use of traditional medicine is considered safer compared to modern treatments. One of the plants used as traditional medicine by the Dayak community is the laban plant, also known as halaban (*Vitex pinnata*), a plant native to Kalimantan. This study aims to analyse the effect of consuming boiled halaban (*Vitex pinnata*) leaf water on blood glucose levels. The research employed a quasi-experimental design with a control group and a pre-test–post-test approach. A total of 21 respondents were selected using a simple random sampling technique. The results of the Wilcoxon test showed that before the intervention (pre-test), the majority of respondents (75.0% or 15 individuals) had high blood glucose levels. After consuming the boiled halaban leaf water (post-test), 50.0% (10 individuals) experienced a decrease in blood glucose levels to the moderate category. The Wilcoxon test indicated a statistically significant reduction in blood glucose levels after the intervention ( $p = 0.000, < 0.05$ ). It can be concluded that consuming boiled halaban leaf water has a significant effect in lowering blood glucose levels.

**Keywords:** Leaves Halaban, Glucose Blood, Diabetes Mellitus.

#### ABSTRAK

Diabetes merupakan kondisi kronis yang serius yang terjadi akibat ketidakmampuan pankreas dalam memproduksi insulin dalam jumlah yang cukup atau karena tubuh tidak dapat secara efektif menggunakan insulin yang diproduksi. Secara umum, penggunaan obat tradisional dianggap lebih aman dibandingkan dengan pengobatan modern. Salah satu tanaman yang dimanfaatkan sebagai obat tradisional oleh masyarakat Dayak adalah tanaman laban, yang juga dikenal dengan nama halaban (*Vitex pinnata*), tumbuhan khas Kalimantan. Penelitian ini bertujuan untuk menganalisis pengaruh konsumsi air rebusan daun halaban (*Vitex pinnata*) terhadap kadar glukosa darah. Metode yang digunakan dalam penelitian ini adalah desain kuasi-eksperimen dengan kelompok kontrol dan pendekatan pre-test–post-test. Sebanyak 21 responden dipilih melalui teknik simple random sampling. Hasil uji Wilcoxon menunjukkan bahwa sebelum intervensi (pre-test), mayoritas responden (75,0% atau 15 orang) memiliki kadar gula darah yang tinggi. Setelah mengonsumsi rebusan daun halaban (post-test), sebanyak 50,0% (10 orang) mengalami penurunan kadar gula darah ke kategori sedang. Uji Wilcoxon menunjukkan penurunan yang signifikan secara statistik pada kadar glukosa darah setelah intervensi ( $p = 0,000, < 0,05$ ). Disimpulkan bahwa konsumsi air rebusan daun halaban memiliki pengaruh yang signifikan dalam menurunkan kadar glukosa darah.

**Kata kunci:** Daun Halaban, Glukosa Darah, Diabetes Melitus.

## INTRODUCTION

Diabetes mellitus is a metabolic disease characterised by hyperglycaemia as a result of impaired insulin secretion, insulin action, or both. Uncontrolled blood glucose levels can lead to serious complications such as cardiovascular disease, neuropathy, and nephropathy (Fatimah et al., 2023). Therefore, effective blood glucose management is crucial for individuals with diabetes mellitus (Putri, Widyastuti, & Fitria, 2023).

Epidemiological data show that the prevalence of diabetes mellitus in Indonesia continues to rise. According to the International Diabetes Federation (IDF) in 2021, the prevalence of diabetes among individuals aged 20–79 in Indonesia reached 10.6%, with approximately 19.5 million people affected. The 2023 Indonesian Health Survey (SKI) by the Ministry of Health reported that the prevalence of diabetes mellitus among people aged over 15 had reached 11.7%. This trend has shown a significant increase, from 5.7% in 2007 to 6.9% in 2013. Furthermore, DKI Jakarta recorded the highest provincial prevalence of diabetes in 2023. The increasing trend highlights the urgent need for effective prevention and management efforts to reduce the incidence and complications related to diabetes mellitus in Indonesia.

In addition to conventional medical therapy, the use of medicinal plants as an alternative or complementary treatment for diabetes mellitus has been widely studied. One such potential plant is the halaban leaf (*Vitex pinnata*), which has traditionally been used by local communities in Central Kalimantan to stabilise blood sugar levels and prevent bacterial growth in the bloodstream (Novianty et al., 2023).

A study by Fatmaria et al., (2019) on *Vitex pinnata* showed that methanol extracts and ethyl acetate fractions of the plant's leaves contain flavonoids, phenolics, saponins, and tannins. These compounds have been found to act as in vitro inhibitors of the  $\alpha$ -glucosidase enzyme, which plays an important role in controlling blood glucose levels. Additionally, other studies have indicated that ethanol extracts from the bark of *Vitex pinnata* possess in vivo antioxidant potential, as evidenced by a reduction in serum malondialdehyde (MDA) levels and increased plasma superoxide dismutase (SOD) activity in mice undergoing oxidative stress.

However, research into the direct effects of consuming boiled halaban leaf water on blood glucose levels in individuals with diabetes mellitus remains limited. Therefore, this study aims to explore the effect of consuming boiled halaban (*Vitex pinnata*) leaf water on blood glucose levels in diabetes mellitus patients, in the hope of offering a safe and effective alternative treatment option.

## RESEARCH METHODS

This study employed a quasi-experimental design using a one-group pretest–posttest approach. In this design, measurements were taken before the intervention (pretest) and again after the intervention (posttest). This allows the effectiveness of the treatment to be assessed more accurately by comparing the participants' conditions before and after the intervention. However, as this design lacks a control group, it is more susceptible to bias.

The research was conducted from August 2024 to February 2025 at the Meskom Health Centre. The study population comprised all patients with diabetes mellitus treated at the centre between August and October 2024, totalling 25 individuals. The sample consisted of 20 diabetes mellitus patients from the Meskom Health Centre catchment area, specifically from Sebauk Village. Participants were selected using purposive sampling based on their willingness to take part and their compliance with the intervention protocol.

In this study, five out of the 25 eligible participants declined to consume the halaban leaf decoction due to disliking its taste. As a result, the final sample included 20 participants. The intervention involved the consumption of 300 ml of warm halaban leaf decoction each morning after breakfast. This was carried out over a period of 10 consecutive days, and compliance was monitored via video calls during consumption.

The success of the intervention was assessed by comparing pre- and post-intervention blood glucose levels. A decrease in blood glucose levels after the intervention indicated a positive response. Data analysis was performed using the Wilcoxon signed-rank test. This research has received ethical approval from the ethics commission of Al Insyirah Institute of Health and Technology, Pekanbaru, with number: 22/KEP/XI/2024.

## RESULTS

**Table 1.** Distribution Frequency Characteristics Respondents.

Characteristics	N	%
Age		
< 45 years	3	15
45-60 years	15	75
> 60 years	2	10
Gender		
Man	9	45
Woman	11	55
Education		
Elementary School	6	30
Junior High School	6	30
Senior High School	8	40
Work		
Housewife	11	55
Farmer	4	20
Self-employed	5	25

Table 1 shows that the characteristics of the respondents show that the majority (75%) are aged between 45-60 years, while 10% are over 60 years old, and 15% are under 45 years old. In terms of gender, 45% of respondents are male, while 55% are female. Regarding education, 30% of respondents have completed elementary school, 30% have finished junior high school, and 40% have completed senior high school. In terms of occupation, most respondents are housewives (55%), followed by farmers (20%) and self-employed individuals (25%).

**Table 2.** Blood Sugar Levels Before and After Giving Halaban Leaves.

Category	N	%
Blood Sugar Before Intervention		
150 mg% - 200 mg%	0	0
200 mg% - 260mg%	15	75
261 mg% - 300 mg%	5	25
Blood Sugar After Intervention		
150 mg% - 200 mg%	9	45
200 mg% - 260mg%	10	50
261 mg% - 300 mg%	1	5

Table 2 shows that before the intervention, none of the respondents had blood sugar levels in the normal range (150 mg% - 200 mg%). A majority of 75% had blood sugar levels ranging from 200 mg% - 260 mg%, while 25% had levels above 260 mg% - 300 mg%. After the intervention, 45% of respondents experienced a decrease in blood sugar levels to the range of 150 mg% - 200 mg%, which is close to the normal level. Additionally, 50% remained in the 200 mg% - 260 mg% range, showing an improvement from the previous 75%. Only 5% of respondents still had high blood sugar levels above 260 mg%, a significant reduction from the initial 25% before the intervention.

**Table 3.** Wilcoxon Test Effect of Halaban Leaves on Blood Sugar Levels.

Variables	Mean (%)	SD	Z	p-value
Blood Sugar Before Intervention	230 mg	23,128		
Blood Sugar After Intervention	175 mg	20,111	-3.921	0.000

Table 3 shows that these results indicate that consuming halaban leaf (*Vitex pinnata*) decoction has an effect on reducing blood sugar levels in diabetes mellitus patients. Most respondents who initially had high blood sugar levels experienced a decrease after the intervention, with a significant proportion shifting to lower ranges. This suggests that halaban leaf decoction could be an effective non-pharmacological method to help control blood sugar levels.

## DISCUSSION

This study shows that the administration of halaban leaf decoction (*Vitex pinnata*) has a significant effect on reducing random blood sugar levels (RBS) in diabetes mellitus patients in Sebauk Village, the working area of Meskom Health Center. Before the intervention, the majority of respondents had RBS levels in the range of 200 mg/dL - 260 mg/dL (75.0%), while after the intervention, most respondents experienced a decrease in RBS levels to a lower range, namely 150 mg/dL - 200 mg/dL (45.0%). The Wilcoxon statistical test results showed a *p-value* of 0.000 ( $p < 0.05$ ), indicating a significant difference between RBS levels before and after the intervention.

According to the Indonesian Endocrinology Association, normal random blood sugar levels are  $<200$  mg/dL, whereas RBS levels  $\geq 200$  mg/dL can be categorized as hyperglycemia, which is an indication of diabetes mellitus (PERKENI, 2019). One non-pharmacological approach to lowering blood sugar levels is the utilization of herbal plants containing bioactive compounds that can increase insulin sensitivity and reduce blood glucose levels. Previous studies have shown that several bioactive compounds, such as flavonoids, saponins, and tannins, play a role in regulating glucose metabolism and enhancing insulin function (Sok Yen et al., 2020; Choudhary, Khatik, & Suttee, 2021; Tran, Pham, & Le, 2020; Unuofin, & Lebelo, 2020).

Halaban leaves (*Vitex pinnata*) are known to contain flavonoids, saponins, and tannins, which act as antioxidants and hypoglycemic agents. Flavonoids help lower blood sugar levels by increasing insulin secretion from the pancreas and improving pancreatic beta-cell function. This mechanism allows the body to process glucose more efficiently and reduce excessive blood sugar levels (Sok Yen et al., 2020; Lee et al., 2020; Lavle, Shukla, & Panchal, 2016). Additionally, flavonoids have anti-inflammatory properties that help reduce inflammation in pancreatic beta cells caused by oxidative stress (Singh, Kushwaha, & Gupta, 2020; Ansari et al., 2025). Saponins also contribute by inhibiting the alpha-glucosidase enzyme, which slows down glucose absorption in the intestines (Choudhary, Khatik, & Suttee, 2021; Lee et al., 2020). The tannins in halaban leaves also have antihyperglycemic properties, acting by inhibiting carbohydrate-digesting enzymes and increasing insulin sensitivity (Aryaeian, Sedehi, & Arablou, 2017; Kabir et al., 2021).

The administering salam leaf (*Syzygium polyanthum*) extract, which also contains flavonoids and tannins, can lower blood sugar levels in type 2 diabetes mellitus patients (Hayati, & Hidayat, 2020). The moringa leaf (*Moringa oleifera*) decoction has a significant hypoglycemic effect on diabetes mellitus patients (Safitri, Lestari, & Fitri, 2023). The herbal plants containing bioactive compounds can help reduce blood sugar levels in diabetes mellitus patients (Sun et al., 2021). The polyphenol compounds in herbal plants have a positive effect in increasing insulin sensitivity and reducing insulin resistance (Ramírez-Moreno et al., 2022; Fatimah et al., 2023). The herbal plants containing bioactive compounds can help reduce blood sugar levels in diabetes mellitus patients (Sun et al., 2021).

The decrease in blood sugar levels in patients after consuming halaban leaf decoction may be attributed to the bioactive compounds in the plant that play a role in increasing insulin sensitivity and reducing insulin resistance (Al-Snafi et al., 2023; Novianty, Nurman, & Sudiarti, 2023). Additionally, other factors that may contribute to changes in blood sugar levels include dietary patterns, physical activity levels, and patient adherence to consuming halaban leaf decoction regularly during the intervention period (American Diabetes Association, 2022; WHO, 2021). However, this study has several limitations, such as a relatively small sample size and the absence of a control group, which would allow for a more objective comparison of the effectiveness of halaban leaf decoction. Therefore, further research with more rigorous methodologies is needed to confirm these findings.

The decrease in blood sugar levels in patients after consuming halaban leaf decoction may be attributed to the combination of these mechanisms. Other contributing factors to blood sugar changes include dietary patterns, physical activity levels, and patient adherence to regularly consuming halaban leaf decoction during the intervention period. Several studies indicate that patients with a balanced diet and sufficient physical activity are more likely to experience improvements in their blood sugar levels (American Diabetes Association, 2022; WHO, 2021). Therefore, future research should consider lifestyle factors that may influence the effectiveness of herbal interventions in lowering blood sugar levels.

However, this study has some limitations, such as a relatively small sample size and the absence of a control group, which would allow for a more objective comparison of the

effectiveness of halaban leaf decoction. Additionally, the limited duration of the intervention may have influenced the study results, indicating the need for further research with a longer duration and more rigorous methodologies to confirm these findings.

## CONCLUSION

Based on the research findings, respondents' blood sugar levels decreased after consuming halaban (*Vitex pinnata*) leaf decoction. The administration of halaban leaf decoction had a significant effect on reducing blood sugar levels among diabetes mellitus patients in the working area of Meskom Health Centre.

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