



Potential of Sambung Nyawa Leaves (*Gynura procumbens*) as Antidiabetic Mellitus

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ABSTRACT

Diabetes mellitus is a metabolic disease characterized by an increase in blood sugar due to defects in insulin secretion, insulin sensitivity, or both. The number of people with diabetes mellitus in Indonesia has increased every year. The number of people with diabetes is 6.9% in 2013 to 10.9% in 2018. Various therapies have been carried out for the treatment of Diabetes Mellitus, one of which is herbal therapy. *Gynura procumbens* is a plant that is widely used as a treatment for diabetes mellitus, kidney, rash and fever, and hypertension. The flavonoid content in *Gynura procumbens* replaces the decrease in blood sugar. This review article attempts to explain the role of *Gynura procumbens* as an antidiabetic therapy in previous studies. The method used in this article is through searching articles through the NCBI database and Google Scholar. The results of an article search found that *Gynura Procumbens* has antidiabetic potential which can reduce blood sugar in patients with Diabetes Mellitus.

1. Introduction

Diabetes mellitus is a group of metabolic diseases characterized by increased blood sugar due to defects in insulin secretion, insulin sensitivity, or both. Symptoms that are complained of in diabetes mellitus sufferers are polydipsia, polyuria, polyphagia, weight loss, and tingling sensation. Uncontrolled diabetes can cause serious damage to body systems, especially to nerves and blood vessels. Diabetes Mellitus is one of the leading causes of death worldwide. There are 3.2 million deaths caused directly by diabetes each year. Within 1 minute, 6 people died from diseases related to diabetes. In addition, people affected by diabetes mellitus have increased every year. The number of diabetics in the world has increased from 108 million in 1980 to 422 million in 2014. Based on 2018 RISKESDAS data, the highest number of diabetes

mellitus sufferers in Indonesia is DKI Jakarta, namely 3.4%, while the lowest is NTT, namely 0.9%. Then, the total number of diabetics also increased by 6.9% in 2013 to 10.9% in 2018.^{1,2}

Treatment of diabetes mellitus has been using oral anti-diabetes drugs or insulin injections. Diabetics who undergo drug therapy experience side effects of increasing body weight, an increased risk of hypoglycemia, and an increased risk of chematin. Thus, new strategies are needed for diabetes prevention and treatment. Among the best alternative therapies are herbal medicines that have been used since ancient times for the treatment of diabetes mellitus.³⁻⁵

The Indonesian government advises the public to take herbal medicines because of their low side effects. *Gynura procumbens* is a fast-growing herbal plant

found in tropical Asian countries such as China, Thailand, Indonesia, Malaysia, and Vietnam. In traditional medicine, this plant is widely used for the treatment of diabetes, kidney disease, rashes as well fever, and hypertension.

2. Methods

The method used in writing this article is a literature review. The library sources used in this article consist of 20 libraries from books and national or international journals. Research literature sources in this study used NCBI and Google Scholar with the keywords *Gynura procumbens*, Diabetes Mellitus, antioxidants, antidiabetic, and others. The selection of literature source articles is carried out by reviewing the title and abstract, namely discussing the potential of *Gynura procumbens* as a diabetes mellitus drug. The year of publication of the library sources used in the writing of this article is 2009 to 2019.

3. Results and Discussion

Research on the benefits of *Gynura procumbens* was conducted by several researchers. The results of showed that the ethanol extract of the leaves of Sambung nyawa (*Gynura procumbens*) could reduce blood sugar levels in male mice (*Mus musculus*) induced by alloxan. The greater the dose of the ethanol extract of the leaves of Sambung nyawa given, the more effective it was in reducing blood sugar levels in alloxan-induced mice with a p-value <0.05.⁶

In addition, it was found that there was a significant difference between the control group of rats and the mice that were given the leaf extract of Sambung nyawa. The results showed that the leaf extract of Sambung nyawa with a dose of 2.0 g / kg BW (36.16%) had a better effect on reducing blood glucose levels compared to doses of 1.0 g / kg BW (31.13%) and 1.5. g / kg BW (33.15%), while the results of the calculation of the correlation coefficient show that there is no linear relationship between increased dose and an increase in the effect of decreasing blood glucose levels.⁷

Another study showed that the preliminary test of

giving Sambung nyawa leaves ethanol extract was proven to reduce blood glucose levels in male white mice with diabetes mellitus induced by alloxan. The research data were analyzed to see whether or not it affected blood glucose levels. The results showed that at a dose of 50 mg / KgBB, the ethanol extract of the leaves of Sambung nyawa (*Gynura procumbens*) had the effect of reducing glucose levels.⁸

Another study showed results of the data obtained using ANOVA analysis ($\alpha = 0.05$) states that the optimal dose of the combination of the herbal ethanol extract of sambiloto and ginseng leaves, namely SASN 50:50, can reduce blood glucose levels by 42.86159%, reduce LPO levels by 0.01666 $\mu\text{M} / \text{g}$, increase GSH levels by 2.5066 mm free SH. Combination of ethanol extract of bitter and leaf herbs continuation of life is more effective at reducing blood glucose levels compared to giving alone.⁹

The leaves of the *Gynura procumbens* plant or often referred to as Sambung nyawa is herbal plants belonging to the Asteraceae family. Sambung nyawa plants contain flavonoids, terpenoids, and phenolic acids. This plant has a height of up to 3 meters or more, stems are angular, rather soft, and watery. The leaves are oval with a light green color. The leaves are 6 cm long and 3.5 cm wide. The tip of the leaf is pointed, the base of the leaf is rounded, the edge of the leaf is shallow and the petiole is 1.5 cm or more. Both surfaces of the leaves have fine hair with pinnate affinities.⁹

The classification of *Gynura procumbens* in the plant world can be seen in Table 1. *Gynura Procumben* contains flavonoids and phenolic compounds that act as antioxidants. In the management of diabetes mellitus, flavonoids exhibit strong antioxidant activity. One of the antioxidant effects is that it can increase insulin action. In addition, the ability of flavonoids as antioxidants can protect against the adverse effects of hyperglycemia and increase metabolism and glucose uptake. In addition to their antioxidant effects, flavonoids can act on biological targets involved in type 2 diabetes mellitus such as α -glycosidase and DPP-4. Flavonoids can effectively prevent and/or manage type

2 diabetes mellitus by being anti-free radicals.¹⁰

Apart from that, *Gynura procumbens* also has a role in glucose homeostasis. Weight gain is an indicator of the efficiency of glucose homeostasis. In diabetics, glucose metabolism is rare so there is a breakdown of fat and tissue protein into energy which causes a reduction in muscle mass and results in weight loss. *Gynura procumbens* has several protective effects in controlling muscle wasting by reversing gluconeogenesis, an increase in insulin secretion, or glycemic control.¹¹

Gynura procumbens also has the same anti-diabetic

mechanism as the drug metformin. *G. procumbens* acts at a peripheral level having an insulin-like effect. This herb does not stimulate insulin secretion but resembles or increases insulin action. Its mechanism of action is to increase glucose uptake into peripheral cells. *G. procumbens* was found to increase insulin-stimulated glucose transport across skeletal muscle membranes, similar to metformin. *G. procumbens* acts directly in glucose uptake at the peripheral level, either alone or as an insulin coadjuvant.¹²⁻¹⁶

Table 1. *Gynura procumbens* classification

Kingdom	Plantae
Division	Spermatophyta
Subdivision	Angiosperms
Class	Dicotyledoneae
Order	Asterales
Familia	Asteraceae
Genus	<i>Gynura</i>
Species	<i>(Gynura procumbens)</i>

4. Conclusion

Diabetes mellitus is a metabolic disease characterized by increased levels of glucose in the blood. Treatment of diabetes mellitus used is oral anti-diabetes drugs (OAD) or insulin injections. However, there are some side effects to the use of these oral drugs so it is recommended to use herbal medicines. *Gynura procumbens* is an herbal plant that contains flavonoids, terpenoids, and phenolic acids. This plant can be used as an antidiabetic herbal medicine. The mechanism of action is to increase insulin sensitivity. This is related to increased glucose uptake into peripheral cells so that glucose in the blood decreases. The *Gynura procumbens* plant can be used as an alternative medicine for diabetes mellitus because it contains flavonoids, terpenoids, and phenolic acids, but there is still a need for further studies on possible side effects.

5. References

1. Akowuah G, Ahmad M, and Fei YM. Effects of *Gynura procumbens* leaf extract on plasma lipid peroxidation and total antioxidant status in CCl4-treated rats. *Nat.Prod.J.* 2012; 2: 247–251.
2. Andriyani R, Tyas YU, Dinah FA. antidiabetic activity test and antioxidant combination of ethanol extract of herba Sambiloto (*Andrographis paniculata* Ness) and Sambung Nyawa leaves (*Gynura procumbens*) in Alloxan-induced Diabetes Mellitus Rats. *Indonesian Journal On Medical Science.* 2019. 6 (1).
3. Atangwho IJ, Ebong PE, Eyong EU, Asmawi MZ, Ahmad M. Synergistic antidiabetic activity of *Vernonia amygdalina* and *Azadirachta indica*: biochemical effects and possible mechanism. *J Ethnopharmacol;* 2019

- 141(3): 878-887.
4. Bodeker,G,Salleh and Shekar,S.C. Health and Beauty from the Rain forest: Malaysian Traditions of Ramuan. Editions Didier Millet Pty Ltd.2009: Kuala Lumpur.
 5. Gerstein HC. Effects of intensive glucose lowering in type 2 diabetes. N. Engl. J. Med.2008; 358: 2545-2559.
 6. Kharroubi AT. Diabetes mellitus: The epidemic of the century. World J Diabetes. 2015; 6(6):850.
 7. Pandhare RB, Sangameswaran B. Antidiabetic activity of aqueous leaf extracts of *Sesbania sesban* (L) Merr in streptozotocin-induced diabetic rats. Avicenna J Med Biotech; 2011; 3(1): 37-42.
 8. Pareek H, Sharma S, Khajja BS. Evaluation of hypoglycemic and anti-hyperglycemic potential of *Tridax procumbens* (Linn.) BMC Compl Altern Med;2019; 9(48): 1-7.
 9. Rahman A and Asad M. Chemical and biological investigations of the leaves of *Gynura procumbens*. Int.J.Biosci.2013; 3, 36–43.
 10. Rang. Pharmacology, 7th ed. Churchill Livingstone. Edin burgh. 2015
 11. Basic Health Research (Risikesdas). Research and Development Agency for Health Ministry of the Republic of Indonesia in 2018. http://www.depkes.go.id/resources/download/infoterkini/material_rakorpop_2018/Result%20Risikesdas%202018.pdf - Accessed December 2019.
 12. Sarian MN, Ahmed QU, Mat So'ad SZ. Antioxidant and Antidiabetic Effects of Flavonoids: A Structure-Activity Relationship-Based Study. Biomed Res Int.2017; 8386065.
 13. Sarwar N, Gao P, Seshasai SR, Gobin R, Kaptoge S, et al. Diabetes mellitus, fasting blood glucose concentration, and risk of vascular disease: a collaborative meta-analysis of 102 prospective studies. Emerging Risk Factors Collaboration. Lancet. 2010; 26; 375: 2215-2222.
 14. Sofia. In Vivo Test of Ethanol Extract of *Sambung Nyawa* leaves (*Gynura procumbens*) against decreasing blood sugar levels of male mice (*Mus musculus*) Swiss Webster Diabetes Mellitus Strain. Syah Kuala Medical Journal 2011; (3)1: 321-325.
 15. Syawal Y. Effect of Dewa leaf extract (*Gynura divaricate*) on decreasing blood glucose levels in male white rats using glucose tolerance test method. Surabaya: Unika Widya Mandala Surabaya. 2017
 16. Tan HL, Chan KG, Pusparajah P, Lee LH, Goh BH. *Gynura procumbens*: An Overview of the Biological Activities. Front Pharmacol. 2016; 7: 52.