

# **The Anti-Diabetic Properties of Medicinal Plants: A Comparative Review of Common and Local Varieties**

Phillip T. Nedd<sup>1</sup>, Chi-I Chang<sup>2</sup>, Albert L. Charles<sup>3</sup>

National Pingtung University of Science and Technology

Department of Tropical Agriculture and International Cooperation<sup>1</sup>,

Department of Biological Science and Technology<sup>2</sup>

*Chi-I Chang*

## **Abstract**

Diabetes is widespread around the world, and in Taiwan, diabetes has risen to become the fifth leading cause of death in the country. The odds of mortality for diabetes also increases for individuals with a low socioeconomic status, like the indigenous people. The indigenous people used to rely on herbal remedies to treat ailments, like diabetes, but alternative remedies and their knowledge is slowly disappearing in their villages. The objectives of this study are, to examine the local indigenous herbal remedies, to find local plants that have anti-diabetic properties, and to compare them with other anti-diabetic plants. The indigenous herbs that will be used for this study are, *morus australis*, *abelmoschus moschatus*, and *musa sapientum*. These plants have similar anti-diabetic compounds found in the common plants of the same genus, white mulberry, okra, and banana. More study is needed to compare the effectiveness of the local variety and the common variety and there has been less research done on the anti-diabetic potential of the local plant genus. Overall, this study strengthens the idea that the preservation and research of Taiwan's indigenous herbs is an arena worth investigating.

**Keywords:** *abelmoschus esculentus*, diabetes, indigenous herbs, *musa acuminata*, *morus alba*.

## References

- Bodinham, C. L., Smith, L., Thomas, E. L., Bell, J. D., Swann, J. R., Costabile, A., Russell-Jones, D., Umpleby, A. M., & Robertson, M. D. (2014). Efficacy of increased resistant starch consumption in human type 2 diabetes. *Endocrine Connections*, 3(2), 75–84.
- Cao, Y., Jiang, W., Bai, H., Li, J., Zhu, H., Xu, L., Li, Y., Li, K., Tang, H., Duan, W., & Wang, S. (2021). Study on active components of Mulberry Leaf for the prevention and treatment of cardiovascular complications of diabetes. *Journal of Functional Foods*, 83, 104549.
- Chen, H. D., Shaw, C. K., Tseng, W. P., Chen, H. I., & Lee, M. L. (1997). Prevalence of diabetes mellitus and impaired glucose tolerance in Aborigines and Chinese in eastern Taiwan. *Diabetes research and clinical practice*, 38(3), 199–205.
- Chuang, W. C., Chu, C. H., Hsu, Y. H., & Yao, C. S. (2022). Effect of socioeconomic status on survival in patients on the Diabetes Shared Care Program: Finding from a Taiwan nationwide cohort. *Journal of the Chinese Medical Association: JCMA*, 85(3), 311–316.
- Costa, E. S., França, C. N., Fonseca, F. A., Kato, J. T., Bianco, H. T., Freitas, T. T., Fonseca, H. A., Figueiredo Neto, A. M., & Izar, M. C. (2019). Beneficial effects of green banana biomass consumption in patients with pre-diabetes and type 2 diabetes: A randomised controlled trial. *British Journal of Nutrition*, 121(12), 1365–1375.
- Davis, J. (n.d.). Metformin side effects: Management and who's at risk. WebMD. Retrieved March 10, 2022, from <https://www.webmd.com/diabetes/metformin-side-effects>
- Eleazu, C., & Okafor, P. (2015). Use of unripe plantain (*musa paradisiaca*) in the management of diabetes and hepatic dysfunction in streptozotocin induced diabetes in rats. *Interventional Medicine and Applied Science*, 7(1), 9–16.
- Healthline Media. (2021, August 31). Insulin regular (human): Side effects, dosage, and more. Healthline. Retrieved March 10, 2022, from <https://www.healthline.com/health/drugs/regular-insulin-injectable-solution#side-effects>
- Juan, SC. & Awerbuch-Friedlander, T. & Levins, R. (2016). Ethnic density and mortality: Aboriginal population health in Taiwan. *Public Health Reviews*. 37.
- Li, Y.-G., Ji, D.-F., Zhong, S., Lin, T.-B., Lv, Z.-Q., Hu, G.-Y., & Wang, X. (2013). 1-deoxynojirimycin inhibits glucose absorption and accelerates glucose metabolism in streptozotocin-induced diabetic mice. *Scientific Reports*, 3(1).
- Liu, I.-M., Tzeng, T.-F., & Liou, S.-S. (2009). *abelmoschus moschatus* (Malvaceae), an aromatic plant, suitable for medical or food uses to improve insulin sensitivity. *Phytotherapy Research*, 24(2), 233–239.
- Lovegrove, A., Edwards, C. H., De Noni, I., Patel, H., El, S. N., Grassby, T., Zielke, C., Ulmius, M., Nilsson, L., Butterworth, P. J., Ellis, P. R., & Shewry, P. R. (2015). Role of polysaccharides in food, digestion, and health. *Critical Reviews in Food Science and Nutrition*, 57(2), 237–253.

NHS (n.d.). Side effects of metformin. Retrieved March 10, 2022, from <https://www.nhs.uk/medicines/metformin/side-effects-of-metformin/>

Priya, B., Verma, S., & Sharma, N. (2016). Development of colon targeting drug delivery system using plant polysaccharide. *World J. Pharm. Pharmaceut. Sci.*, 5, 992-1024.

Qiao, Y., Ikeda, Y., Ito, M., Kimura, T., Ikeuchi, T., Takita, T., & Yasukawa, K. (2022). Inhibition of  $\alpha$ -amylase and  $\alpha$ -glucosidase by *morus australis* fruit extract and its components iminosugar, anthocyanin, and glucose. *Journal of Food Science*, 87(4), 1672–1683.

Sabrina, N., Pujilestari, S., Azni, I. N., Amelia, J. R., Surbakti, F. H., & Rismawati, A. (2021). Anti Diabetic and Anti Hypercholesterolemia Potential of *Abelmoschus Esculentus* (Okra) Functional Beverage with Ginger Extract in Streptozotocin-Induced Diabetic Mice. *NVEO-NATURAL VOLATILES & ESSENTIAL OILS Journal* | NVEO, 4405-4412.