



Mini Review

Copyright© Ian Mutasa

A Mini Review on the Antihypertensive Properties of *Persea Americana*, *Myrothamnus Flabellifolius* and *Xeroderris Stuhlmannii*

Ian Mutasa^{1*}, Emmanuel Kademete², William Pote¹, Mazuru Gundidza², Bert LB Nyabadza³
and Jacob Mufunda¹

¹Physiology Unit, Great Zimbabwe University, Zimbabwe

²Herbal Medicine Unit, Great Zimbabwe University, Zimbabwe

³Medical School Library, Great Zimbabwe University, Zimbabwe

*Corresponding author: Ian Mutasa, Physiology Unit, Simon Mazorodze School of Medical and Health Sciences, Great Zimbabwe University, Masvingo, Masvingo Province, Zimbabwe.

To Cite This Article: Ian Mutasa*, Emmanuel Kademete, William Pote, Mazuru Gundidza, Bert LB Nyabadza, et al. A Mini Review on the Antihypertensive Properties of *Persea Americana*, *Myrothamnus Flabellifolius* and *Xeroderris Stuhlmannii*. Am J Biomed Sci & Res. 2025 26(1) AJBSR.MS.ID.003410, DOI: 10.34297/AJBSR.2025.26.003410

Received: 📅 February 28, 2025; Published: 📅 March 06, 2025

Abstract

Plants are rich in bioactive compounds that can be used to manage hypertension. This review emphasizes the role of plants such *Persea americana*, *Myrothamnus flabellifolius*, *Xeroderris stuhlmannii* as potential antihypertensives. They have antioxidants which have the ability to lower blood pressure, therefore improving health against non-communicable diseases.

Keywords: *Persea americana*, *Myrothamnus flabellifolius*, *Xeroderris stuhlmannii*, Hypertension, Herbal remedies, Phytoconstituents, Antihypertensives, Phytochemicals, Blood pressure, Plant-based therapy

Abbreviations: LMIC(s): The Low- and Middle-Income Countries; NCD(s): Non-Communicable-Diseases; ACE: Angiotensin-Converting Enzyme.

Introduction

Hypertension is prevalent worldwide, with increasing rates projected in the coming decades. Key risk factors include age, obesity, poor diet, alcohol consumption, and physical inactivity [1]. The regulation of blood pressure involves a balance between cardiac output and total peripheral resistance, influenced by neural, renal, and endocrine mechanisms [2]. Chronic hypertension can lead to end-organ damage, including heart failure and kidney dysfunction [3]. Herbal remedies have been recognized for their ability

to reduce hypertension, often with fewer side effects compared to traditional antihypertensive medications [4,5]. Herbs have shown potential in managing Stage-1 hypertension, providing a complementary approach to conventional treatments. Herbal treatments often contain antioxidants that combat oxidative stress, contributing to blood pressure regulation [6]. There is ethnopharmacological evidence on the use of *Persea americana*(*Avocado*), *Myrothamnus flabellifolius*(*Resurrection plant*) and *Xeroderris stuhlmannii*(*Wing*



pod) as remedies to several ailments, therefore prompting their investigation to promote therapeutic success and patient safety. The use of these natural therapeutics has been common in the Low- and Middle-Income Countries (LMICs) where conventional treatment may be a challenge to acquire due to economic constraints. Several reports point to the wide use of *P. americana*, *M. flabellifolius* and *X. stuhlmannii* on the management of blood pressure. The scientific evidence is supported by in vivo and invitro studies that have highlighted the potential effectiveness of these plants as antihypertensives [7,8]. The therapeutic applications of the aforementioned plants is supported by the bioactive, and antioxidant properties [9,10]. Folk medicine has played a pivotal role in improving hypertensive patients' quality of life and this has mapped the plant-based therapeutics on the complementary medicines arena. Complementary plant-based medicine offers a holistic approach to management of ailments therefore dealing with underlying conditions that may be influencing Non-Communicable-Diseases (NCDs) like hypertension.

Plant based therapeutics such as *P. americana*, *M. flabellifolius* and *X. stuhlmannii* have great potential as antihypertensives [11]. This emanates from these plants harboring phytoconstituents with blood pressure lowering capabilities. Knowledge deficit still exist and there is ongoing work on proving efficacy of plant-based medicine [12]. Although work has been done to validate the use of natural therapeutics in managing blood pressure, there is need for more investigations to prove their pharmacological benefit [13].

In light of the use of plant based complementary medicines such as *P. americana*, *M. flabellifolius* and *X. stuhlmannii* as potential antihypertensives, this mini review is to explore the potential of herbal treatments on managing high blood pressure.

Pharmacological Importance of Plant-Based Therapy

Plants derived secondary metabolites are known as the main sources of medicines through pharmaceutical standardized formulations or traditional medicine preparations. There is evidence from literature about standard pharmaceuticals sourced from plants, as these sources produce primary and secondary metabolites with varied therapeutic effects [14]. Phytochemicals manage metabolic diseases by enhancing regulation and reducing disease susceptibility [15]. Plants bioactive compounds undergo complex metabolic processes, depending on the individuals' digestive abilities, membrane transporters and gut microbiota thus affecting their bioavailability and therapeutic potential [16]. Secondary plant metabolites scavenge for free radicals, thereby reducing oxidative stress and risks of chronic diseases contributing to phytotherapy preference [17].

Investigation of ethnomedicines is important in drug discovery, contributing to the identification of bioactive compounds with potential therapeutic effects, such as polyphenolic compounds found in *P. americana* seeds [9]. *Persea americana* commonly known as

avocado is a tree native to Central America with nutritional benefits and unique organoleptic properties. Avocado fruits vary in sizes and color [18]. Extracts from *P. americana* leaves and seeds showed ACE inhibitory activity, comparable to standard medications like captopril [11,19]. Previous research has indicated the ability of *P. americana* extract's to significantly lower blood pressure by inhibiting key enzymes and receptors, involved in hypertension regulation. A gap still exists in investigating the side effects of *P. americana* in the management of blood pressure. *Myrothamnus flabellifolius*, commonly known as the resurrection plant, is native to Southern Africa. The essential oils derived from the plant exhibit potent antioxidant effects [20]. The leaf tea is rich in polyphenols, vitamins and essential amino acids benefiting health and nutrition [21]. *Myrothamnus flabellifolius* acts on multiple pathways, potentially offering a more holistic approach compared to conventional therapies. Conventional therapies like ACE inhibitors, for example Captopril, are limited focusing on specific pathways [22]. As a result, *M. flabellifolius* primary action involves inhibition of angiotensin-converting enzyme (ACE), preventing the formation of vasoconstrictor angiotensin II, thereby lowering blood pressure [23]. Further research is required on *M. flabellifolius* toxicological evaluation to provide safe use guidelines. *Xeroderris stuhlmannii* is a tree commonly known as wing pod which exhibits significant antihypertensive and antioxidant activities. The leaf extracts have high levels of phenols, including stuhlmannione A and formononetin, with potential health benefits. These phenol rich, leaf extracts, are attributed to the significant reduction in systolic and diastolic blood pressure by *X. stuhlmannii* [24]. The phytochemicals of *X. stuhlmannii* have proved to have minimum side effects when compared with conventional therapies [25]. Although *P. americana* has been extensively studied, there is still a need to validate it, along with *X. stuhlmannii* and *M. flabellifolius*, as potential complementary therapies for hypertension.

Conclusion

This mini review was intended to elucidate the potential of *Persea americana*, *Xeroderris stuhlmannii* and *Myrothamnus flabellifolius* as antihypertensives. The review yielded insights into the mechanism of action, efficacy and potential applications as complementary medicine, of the aforementioned plants. These plants contain primary and secondary metabolites with therapeutic effects. Plant derivatives have a major application in NCDs such as high blood pressure. An extensive investigation on *P. americana*, *X. stuhlmannii* and *M. flabellifolius* is required to validate the plant-based medicines in managing hypertension. There is a need to explore these medicinal plants' synergistic effects when used in combination with other treatments, enhancing their efficacy.

Acknowledgements

This work was conducted within the framework of the Great Zimbabwe University Agriinnovations in Dry land Agriculture Programme. We are grateful for funding from the Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development (MHTEISTD).

Conflicts of interest

The authors declare there is no conflict of interest regarding the publication of this research manuscript.

References

- Mirza AA, Elmorsy SA (2016) Diagnosis and Control of Hypertension as Indicators of the Level of Awareness Among Relatives of Medical Students in Saudi Arabia. *High Blood Press Cardiovasc Prev* 23(2): 123-132.
- Alves A, Ribeiro F, Pescatello L (2022) Hypertension. In: *Exercise Management for Referred Medical Conditions*. Routledge.
- Mirza M, Hamed Nishath S, Umaira Saeed F (2024) The Silent Storm: Understanding Hypertension. *Int J Innov Sci Res Technol* pp. 3405-3415.
- Sari PI, Martawinarti RN, Mutmainnah M, Meinarisa M, Mekeama L, et al. (2024) Herbal Medicine for Hypertension: Literature Review. *Biospecies* 17(2): 37-42.
- Cho N, Moon H, Shin KM, Kang BK, Leem J, et al. (2025) Safety and effectiveness of an herbal decoction (modified Saengmaeksan) in hypertensive patients: Protocol for a real-world prospective observational study. *PLOS ONE* 20(1): e0316276.
- Zairullah WNAAW, Fauzi NYM, Jofrry SM, Fahrni ML, Ming LC, et al. (2023) Herbs Used for the Management of Hypertension: A Systematic Review. *Curr Tradit Med* 10(3): 35-49.
- Shi D, Xu W, Wong M, Popovich DG (2023) Rapid identification of main antibacterial components from New Zealand 'Hass' avocado peel hexane extract. *Curr Plant Biol* pp. 35-36.
- Juma I (2024) Nature's Pharmacy: Avocado (*Persea americana* Mill.) Leaves as a Novel Therapeutic Agent for Diabetes, Hypertension, High Cholesterol, Gastric Ulcers, Kidney Stones and Gout pp. 13.
- Orabueze IC, Babalola R, Azuonwu O, Okoko II, Asare G (2021) Evaluation of possible effects of *Persea americana* seeds on female reproductive hormonal and toxicity profile. *J Ethnopharmacol* 273: 113870.
- Ghosh P, Ghosh M, Roy D (2024) Beyond conventional treatments: exploring phytochemical remedies from lauraceae and oxalidaceae in urolithiasis. *Int J Pharmacogn* 11(3): 90-99.
- Badejo JA, Michael OS, Adetona MO, Abdulmalik O, Agbebi E, et al. (2022) Mechanisms of anti-hypertensive activity of methanol leaf extract and fractions of *Persea americana* Mill. (Lauraceae) in rats. *Niger J Pharm* 18(1): 63-74.
- Jha S, Vaiphei KK, Alexander A (2023) Chapter 1 - Plant-based therapeutics: current status and future perspectives. In: Singh MR, Singh D, editors. *Phytopharmaceuticals and Herbal Drugs*. Academic Press pp. 3-11.
- Bangash SA, Budhathoki H, Sohail S, Alshehri B, Khan UA, et al. (2024) Natural substances in modern healthcare: an exploration of the role of natural substances, including phytotherapeutics and herbal products, in the context of modern healthcare. *J Popul Ther Clin Pharmacol* 31(2): 2739-2745.
- Raghunath A, Sundarraj K, Kanagaraj VV, Perumal E (2018) Plant Sources as Potential Therapeutics for Alzheimer's Disease. In: *Medicinal Plants*. 1st Edition. CRC Press pp. 32.
- Martín MÁ, Ramos S (2024) Effects of Phytochemicals on Metabolic Diseases and Human Health. *Nutrients* 16(24): 4323.
- Rathaur P, Sr KJ (2019) Metabolism and Pharmacokinetics of Phytochemicals in the Human Body. *Curr Drug Metab* 20(14): 1085-1102.
- Sheneni VD, Muhammad SS, Shaibu IE (2023) Natural chemicals for healthy living: plant secondary metabolic compounds. *MOJ Food Process Technol* 11(2): 98-104.
- Muralidhara BM, Sakthivel T, Shivashankara KS, Karunakaran G, Honnabyraiah MK, et al. (2023) Morpho-biochemical characterization of a unique avocado (*Persea americana* Mill.) accession PA-026 (IC0644455). *J Hortic Sci* 18(2).
- Sutiningsih D, Sari DP, Adi MS, Hadi M, Azzahra NA (2022) Effectiveness of avocado leaf extract (*Persea americana* Mill.) as antihypertensive. *F1000Research*.
- Ajao AA, Balogun FO, Sabiu S, Ashafa AOT (2023) Myrothamnus flabellifolius Welw. (Myrothamnaceae) essential oil scavenges free radicals and inhibits carbohydrate-metabolizing enzymes in vitro. *Egypt J Basic Appl Sci* 10(1): 420-432.
- Chukwuma CI, Matsabisa MG, Rautenbach F, Rademan S, Oyedemi SO, et al. (2019) Evaluation of the nutritional composition of *Myrothamnus flabellifolius* (Welw.) herbal tea and its protective effect against oxidative hepatic cell injury. *J Food Biochem* 43(11): e13026.
- Oyagbemi AA, Bolaji Alabi FB, Ajibade TO, Adejumobi OA, Ajani OS, et al. (2020) Novel antihypertensive action of rutin is mediated via inhibition of angiotensin converting enzyme/mineralocorticoid receptor/angiotensin 2 type 1 receptor (ATR1) signaling pathways in uninephrectomized hypertensive rats. *J Food Biochem* 44(12): e13534.
- Shobana M, Thilagavathi S (2022) Identification of Borassus Flabellifer Sap Compounds Against Angiotensin- Converting Enzyme for Potential Antihypertensive Inhibitors: Life Sciences-Medicine. *Int J Life Sci Pharma Res* pp. 191-197.
- Kuinze AN, Nguemfo EL, Yousseu WN, Kojom JJW, Bogning Zangué C, et al. (2024) Xeroderris Stuhlmannii (Fabaceae): Evidence of the Antihypertensive and Antioxidant Activities of its Leaf Aqueous Extract in Cadmium Chloride Hypertensive Rats. Rochester, NY: Social Science Research Network.
- Tabassum N, Ahmad F (2011) Role of Natural Herbs in the Treatment of Hypertension. *Pharmacogn Rev* 5(9): 30-40.