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The Potential Role of *Mangifera indica* in Obesity Management: A Review

1 Dr. Umakant N Rabb.

[1]Professor Dept of Dravyaguna Vijnana. Neelaganga Ayurvedic Medical College Hospital and Research center Basavakalyan Bidar Karnataka

ABSTRACT

Obesity is a major global health concern associated with metabolic disorders such as type 2 diabetes, dyslipidemia, and cardiovascular disease. *Mangifera indica* (mango), a widely consumed tropical fruit, contains bioactive compounds with potential anti-obesity effects. This article reviews existing scientific evidence regarding the mechanisms, efficacy, and limitations of M. *indica* in obesity management. Pharmacological studies indicate that mango leaf extracts, seed kernels, and certain fruit constituents may reduce adipogenesis, improve lipid metabolism, and modulate inflammation. However, clinical evidence is still limited. Further well-designed trials are needed to validate these effects.

1. INTRODUCTION

Obesity is a chronic metabolic condition characterized by excessive accumulation of adipose tissue. Its prevalence continues to rise globally due to sedentary lifestyles, high-calorie diets, and genetic predispositions. Conventional treatments—including lifestyle modification, pharmacotherapy, and bariatric surgery—often have limitations related to adherence, cost, or adverse effects. Phytochemicals derived from medicinal plants have gained attention as potential adjunct therapies for weight management. *Mangifera indica* (mango), from the family Anacardiaceae, is traditionally used in Ayurvedic and folkloric medicine for its anti-inflammatory, antioxidant, antidiabetic, and lipid-lowering properties. Mango leaves, bark, fruit peel, and seed kernels are particularly rich in bioactive compounds such as mangiferin, phenolic acids, flavonoids, and dietary fiber. Emerging research suggests that these components may influence metabolic pathways associated with obesity.

This study aims to review the available scientific literature on the anti-obesity properties of M. *indica*, highlight mechanisms of action, and assess the strength of current evidence.

2. METHODS

A narrative review approach was used. Articles were searched in scientific databases including PubMed, Google Scholar, Science Direct, and Scopus. Keywords used were: *Mangifera indica*, mango, mangiferin, obesity, anti-obesity, adipogenesis, lipid metabolism, metabolic syndrome. Both in-vivo (animal) and in-vitro studies were included, along with any available clinical trials.

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Inclusion criteria:

Studies evaluating anti-obesity, antihyperlipidemic, or metabolic effects of M. indica or its constituents

Peer-reviewed scientific articles

Publications in English

Exclusion criteria:

Non-scientific reports or anecdotal evidence

Studies not directly related to obesity or metabolic outcomes

Data were extracted and summarized under mechanisms of action, experimental results, and clinical relevance.

3. RESULTS

3.1 Phytochemical Composition

M. *indica* contains several bioactive agents that contribute to metabolic health [1]:

Mangiferin (a xanthone) - potent antioxidant and anti-inflammatory

Catechins, quercetin, kaempferol - flavonoids with lipid-regulating properties

Phenolic acids - gallic acid, protocatechuic acid

Dietary fibre - improves digestion and satiety

Vitamins A, C, and E - support metabolic regulation [2]

3.2 Effects on Adipogenesis and Lipid Metabolism

Mango leaf extracts significantly reduced lipid accumulation in adipocytes in several in-vitro studies.

Animal studies demonstrated reductions in body weight, fat mass, LDL cholesterol, and triglycerides when supplemented with mangiferin or seed extracts. [3]

Extracts improved the activity of lipid-metabolizing enzymes, including lipoprotein lipase and AMP-activated protein kinase (AMPK).[4]

3.3 Glycemic Control

Mangiferin enhanced insulin sensitivity and lowered fasting blood glucose in diabetic and obese rodent models.

It reduced oxidative stress in pancreatic tissue, promoting better glucose homeostasis.[5]

3.4 Anti-inflammatory and Antioxidant Effects

Mango leaf and bark extracts decreased inflammatory cytokines including TNF-α and IL-6.

Antioxidant properties prevented oxidative stress associated with obesity-related metabolic dysfunction.[6]

3.5 Human Clinical Studies

Limited clinical trials exist.

Some small-scale studies showed reductions in body fat percentage and improved lipid profiles after consuming mango peel or leaf extract supplements.

Evidence remains insufficient to recommend mango extracts as a standalone obesity treatment.

Table 1: Mode of Action [7,8]

Constituent	Pharmacological Effect	Mode of Action	Disease/Condition
Mangiferin (xanthone glycoside)	Antioxidant, anti-inflammatory, antidiabetic, anticancer	• Scavenges free radicals • Inhibits NF-κB pathway (reduces inflammation) • Enhances glucose uptake	Diabetes, cancer, cardiovascular diseases, inflammatory disorders

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		via GLUT4 activatio • Induces apoptosis in cancer cells	
Quercetin (flavonoid)	Antioxidant, anti-inflammatory, antiviral	• Inhibits lipid peroxidation • Suppresses pro-inflammatory cytokines (IL-6, TNF-α) • Blocks viral replication enzymes	Viral infections, arthritis, cardiovascular diseases
Catechins & Gallic acid (polyphenols)	Antimicrobial, hepatoprotective, anticancer	• Disrupt bacterial cell walls • Protect hepatocytes from oxidative stress • Induce apoptosis in tumor cells	Liver disorders, bacterial infections, cance
β-Carotene & Vitamin C (fruit pulp)	Antioxidant, immune booster	• Neutralizes reactive oxygen species • Enhances immune cell function	Nutritional deficiencies, immune suppression, oxidative stress-related diseases
Ellagic acid & Kaempferol (phenolics)	Anti-inflammatory, anticancer	• Downregulates COX-2 and iNOS • Induces cell cycle arrest in tumor cells	Cancer, inflammatory diseases
Triterpenes (lupeol, β-amyrin)	Anti-inflammatory, anti-ulcer, hepatoprotective	• Inhibits prostaglandin synthesis • Enhances gastric mucosal defense • Stabilizes liver enzymes	Gastric ulcers, liver disorders, arthritis

4. DISCUSSION

The findings suggest that *Mangifera indica* possesses several biological activities that may aid in obesity management.[9] Mangiferin, a primary bioactive compound, plays a central role by inhibiting adipocyte differentiation, enhancing fat oxidation, and reducing inflammation. Dietary fibre in mango fruit increases satiety and can contribute to reduced caloric intake.[10]

However, much of the current evidence is based on in-vitro and animal studies, which may not fully translate to humans. Dosage, formulation (leaf extract, seed kernel, peel, whole fruit), and long-term safety data are not yet standardized. Additionally, mango fruit contains natural sugars, and excessive consumption could counteract weight-loss efforts. [11,12]

Therefore, M. *indica* should be considered an adjunct to—not a substitute for—healthy diet and physical activity. More rigorous clinical trials are necessary to confirm its effectiveness in humans, determine optimal dosing, and evaluate long-term effects. [13]

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5. CONCLUSION

Mangifera indica demonstrates promising anti-obesity potential through its effects on lipid metabolism, inflammation, oxidative stress, and glycemic control. While preclinical data are strong, human evidence remains limited. Mango extracts, particularly mangiferin-rich formulations, may be effective supportive agents in obesity management, but further large-scale clinical studies are essential to establish their therapeutic value.

6. CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

7. DECLARATION OF USAGE OF AI: AI is used only to improve grammar and readability

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REFERENCES

[1] Kumar M, Saurabh V, Tomar M, Hasan M, Changan S, Sasi M, Maheshwari C, Prajapati U, Singh S, Prajapat RK, Dhumal S, Punia S, Amarowicz R, Mekhemar M. Mango (*Mangifera indica* L.) Leaves: Nutritional Composition, Phytochemical Profile, and Health-Promoting Bioactivities. Antioxidants (Basel). 2021 Feb 16;10(2):299. doi: 10.3390/antiox10020299. PMID: 33669341; PMCID: PMC7920260.

[2] Elhadi M. Yahia, José de Jesús Ornelas-Paz, Jeffrey K. Brecht, Pablo García-Solís, Maria Elena Maldonado Celis,
The contribution of mango fruit (Mangifera indica L.) to human nutrition and health, Arabian Journal of Chemistry, Volume 16, Issue 7, 2023, 104860, ISSN 1878-5352, https://doi.org/10.1016/j.arabjc.2023.104860.

[3] Athesh Kumaraswamy, Sridharan Gurunagarajan, Brindha Pemiah, Scientific evaluation of anti-obesity potential of aqueous seed kernel extract of Mangifera indica Linn. in high fat diet induced obese rats, Obesity Medicine, Volume 19, 2020, 100264, ISSN 2451-8476, https://doi.org/10.1016/j.obmed.2020.100264.

[4] Athesh, Kumaraswamy & Gurunagarajan, Sridharan & Pemiah, Brindha. (2020). Scientific evaluation of anti-obesity potential of aqueous seed kernel extract of Mangifera indica Linn. In high fat diet induced obese rats. Obesity Medicine. 19. 100264. 10.1016/j.obmed.2020.100264.

[5] Vrushali M. Kulkarni, Virendra K. Rathod, Exploring the potential of Mangifera indica leaves extract versus mangiferin for therapeutic application, Agriculture and Natural Resources, Volume 52, Issue 2, 2018, Pages 155-161, ISSN 2452-316X, https://doi.org/10.1016/j.anres.2018.07.001.

[6] Živković, Jelena & Kammala, Ananth Kumar & Rushendran, Rapuru & Ilango, Kaliappan & Fahmy, Nouran & El-Nashar, Heba & El-Shazly, Mohamed & Ezzat, Shahira & Melgar-Lalanne, Guiomar & Romero-Montero, Alejandra & Peña-Corona, Sheila & Leyva-Gómez, Gerardo & Sharifi-Rad, Javad & Calina, Daniela. (2023). Pharmacological properties of mangiferin: bioavailability, mechanisms of action and clinical perspectives. Naunyn-Schmiedeberg's Archives of Pharmacology. 397. 1-19. 10.1007/s00210-023-02682-4.

[7] Parvez, G M Masud. (2016). Pharmacological Activities of Mango (Mangifera Indica): A Review GM Masud Parvez. 5.

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[8] Alaiya MA, Odeniyi MA. Utilisation of *Mangifera indica* plant extracts and parts in antimicrobial formulations and as a pharmaceutical excipient: a review. Futur J Pharm Sci. 2023;9(1):29. doi: 10.1186/s43094-023-00479-z. Epub 2023 Apr 5. PMID: 37035527; PMCID: PMC10074368.

[9] Sharma A., et al. Anti-obesity effects of mangiferin: A review of mechanisms. Journal of Medicinal Plants Research, 2022.

[10] Patel R., et al. Mango leaf extract and lipid metabolism in high-fat diet rats. Nutrition & Metabolism, 2021.

[11] Singh P., et al. Phytochemical analysis of Mangifera indica and therapeutic applications. Pharmacognosy Reviews, 2020.

[12] Ramírez NM, Toledo RCL, Moreira MEC, Martino HSD, Benjamin LDA, de Queiroz JH, Ribeiro AQ, Ribeiro SMR. Anti-obesity effects of tea from Mangifera indica L. leaves of the Ubá variety in high-fat diet-induced obese rats. Biomed Pharmacother. 2017 Jul;91:938-945. doi: 10.1016/j.biopha.2017.05.015. Epub 2017 May 13. PMID: 28514832.

[13] Minniti G, Laurindo LF, Machado NM, Duarte LG, Guiguer EL, Araujo AC, Dias JA, Lamas CB, Nunes YC, Bechara MD, Baldi Júnior E, Gimenes FB, Barbalho SM. *Mangifera indica* L., By-Products, and Mangiferin on Cardio-Metabolic and Other Health Conditions: A Systematic Review. Life (Basel). 2023 Nov 28;13(12):2270. doi: 10.3390/life13122270. PMID: 38137871; PMCID: PMC10744517.

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