

CHAPTER 6

Nature's weight balance: medicinal plants for obesity relief

Anuradha Das¹, Nibedita Jena², Sweta Mishra², Anju Kumari Thakur³,
Gulshan Kumar⁴ and Sanjeet Kumar^{2*}

¹Department of Botany, Sindri College Sindri, Binod Bihari Mahto Koylanchal University, Dhanbad, Jharkhand, India

²Ambika Prasad Research Foundation, Odisha, India

³Division of Botany, Career Point University, Hamirpur, Himachal Pradesh, India

⁴School of Basic and Applied Sciences, Career Point University, Bhoranj (Tikker-Kharwariyan), Hamirpur, Himachal Pradesh, India

*Email-Id: sanjeetaprf@gmail.com



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Abstract

Present study explored the therapeutic potential of diverse medicinal plants traditionally used to manage obesity and related metabolic disturbances. A comprehensive literature survey was conducted using databases such as PubMed, Scopus, Web of Science and NCBI with targeted ethnomedicinal related keywords. The compilation highlighted plants such as *Camellia sinensis*, *Capsicum annuum*, *Curcuma longa*, *Nigella sativa* and *Garcinia gummi-gutta*, along with lesser-known species including *Casearia sylvestris*, *Caralluma fimbriata* and *Neolitsea cassia*. These plants are consumed in various forms including, decoctions, teas, powders, fermented preparations, juices and dietary inclusions and have been reported to influence lipid metabolism, glycaemic control, appetite regulation and fat accumulation. The data provided an overview of their modes of use and traditional relevance, emphasizing the growing scientific interest in plant-based interventions for obesity management. The current work highlighted the importance of integrating ethnobotanical knowledge with modern research to identify safe, accessible and effective natural strategies for weight control.

Keywords: Appetite regulation, glycaemic control, metabolic disturbances, therapeutic potential

Introduction

Obesity has emerged as one of the most pressing global health challenges of the twenty-first century, driven by sedentary lifestyles, energy-dense diets, complex metabolic, genetic and environmental interactions (Aremu *et al.*, 2025; Ullah and Tamanna, 2025). Its rapid rise has contributed to an increased burden of non-communicable diseases such as type 2 diabetes, cardiovascular disorders, hypertension and certain cancers (Garus-Pakowska, 2023; Boddu *et al.*, 2025). Although conventional pharmacological treatments and lifestyle modifications remain central to obesity management, these approaches often show limited long-term success, undesirable side effects or reduced patient compliance (Chamarthi and Daley, 2025; Sombra and Anastasopoulou, 2025). As a result, the scientific community and the general population have shown growing interest in natural, plant-based strategies that may offer safer and more sustainable solutions (Sabate and Soret, 2014; Wang *et al.*, 2025). Medicinal plants have played an integral role in traditional healing systems across cultures, providing a rich source of bioactive compounds with therapeutic potential (Ansari *et al.*, 2025). Numerous species possess properties that influence metabolism, appetite, lipid absorption, thermogenesis and glycaemic regulation mechanisms directly relevant to body-weight control. Plants such as *Camellia sinensis*, *Garcinia gummi-gutta*, *Capsicum annuum* and *Trigonella foenum-graecum* have gained scientific recognition for their anti-obesity effects, while several lesser-studied species including *Achyranthes aspera*, *Casearia sylvestris*, *Geranium nepalense* and *Neolitsea cassia* are being re-examined for their metabolic benefits. These medicinal plants are consumed in diverse forms, ranging from teas and decoctions to functional foods, powders and extracts, reflecting their deep-rooted cultural and ethnobotanical significance. Present study compiled information on a wide range of plants traditionally used for weight management. From their botanical identities, families, modes of use and supporting literature, recent work aims to bridge traditional knowledge with contemporary scientific understanding. Such integration not only enhances the appreciation of medicinal plants as potential therapeutic agents but also supports ongoing efforts to develop accessible, culturally relevant and evidence-based interventions for combating obesity.

Methodology

An in-depth review of the literature on medicinal plants traditionally utilized by local communities was performed. Search terms such as "ethnomedicinal plants", "herbal remedies", "traditional practices in obesity problems", "therapeutic applications", "methods of administration" and "natural health practices to reduce obesity" were applied across several databases, including PubMed, Scopus, Web of Science, NCBI and others. Information on plants employed in the management of obesity was compiled by examining relevant books and scientific publications. After the plant species were identified by the authors, standard botanical references were consulted to verify their taxonomy and nomenclature (Arora *et al.*, 2015; Kumar, 2025).

Results and discussion

The compilation of 27 medicinal plant species demonstrated a diverse spectrum of botanical resources traditionally used for managing obesity and metabolic disturbances (Table 1;

Figure 1). Present study revealed that these plants belong to a wide range of families most notably Poaceae, Fabaceae and Zingiberaceae indicating that anti-obesity potential is distributed across multiple plant lineages rather than confined to specific taxonomic groups. Modes of use vary widely, from decoctions (*Achyranthes aspera*) and teas (*Camellia sinensis*, *Cymbopogon citratus*, *Nelumbo nucifera*) to powders (*Curcuma longa*, *Piper nigrum*), raw plant parts (*Caralluma fimbriata*) and functional foods (*Coix lacryma-jobi*, *Phaseolus vulgaris*) (Figure 2). Many of these plants are integrated into daily diets, suggesting both accessibility and long-standing cultural acceptance. Across sources, several species consistently align with improved lipid profiles, reduced fat accumulation, enhanced thermogenesis, appetite suppression or glycaemic regulation mechanisms central to weight-management strategies. Present investigation highlighted the plants with strong scientific backing. *Camellia sinensis*, one of the most studied species, is noted for its catechin-mediated effects on fat oxidation and metabolic rate (Brimson *et al.*, 2022; Zhao *et al.*, 2022). *Garcinia gummi-gutta*, traditionally consumed as a fruit rind beverage, contains hydroxycitric acid associated with appetite suppression and inhibition of lipogenesis (Anilkumar *et al.*, 2023). Thermogenic properties are evident in *Capsicum annuum*, where capsaicinoids have been linked to increased energy expenditure and lipid metabolism (Irandoost *et al.*, 2020). Meanwhile, fibre-rich species such as *Phaseolus vulgaris* and *Trigonella foenum-graecum* contribute to satiety and delayed carbohydrate absorption, offering complementary metabolic benefits. Emerging plants, including *Geranium nepalense*, *Casearia sylvestris* and *Neolitsea cassia* show promise but require more extensive pharmacological validation. Their traditional uses for reducing fat accumulation or modulating metabolic pathways provide a strong foundation for future research. The present findings emphasized that medicinal plants represent a valuable, multifaceted resource for obesity management, grounded in both traditional knowledge and evolving scientific evidence. While many listed species exhibit bioactive properties relevant to weight control, variability in preparation methods, dosages and phytochemical composition highlighted the need for standardized clinical investigations. Nonetheless, the diversity and accessibility of these plants support their potential role as adjunct therapies or preventive strategies in combating obesity. Integrating ethnobotanical wisdom with rigorous scientific evaluation can help identify safe, effective and culturally relevant plant-based interventions for modern healthcare practice.

Table 1: List of medicinal plants traditionally used against obesity

Botanical name	Common name	Family	Mode of use	Sources
<i>Achyranthes aspera</i> L.	Apamarga (S)	Amaranthaceae	The root or aerial parts decoction is consumed orally.	Rani <i>et al.</i> , (2012)
<i>Annona montana</i> Macfad.	Mountain soursop (E)	Annonaceae	The plant parts have potential benefits	Junior and Almeida, (2017)

			related to glycaemic and lipid profiles.	
<i>Asparagus officinalis</i> L.	Sparrow grass (E)	Asparagaceae	It is used as a vegetable by steamed, roasted, grilled or by added to salads.	Sun <i>et al.</i> , (2021)
<i>Camellia sinensis</i> (L.) Kuntze	Green tea (E)	Theaceae	The brewed tea made from its leaves consumed regularly about 8 to 12 weeks for effective result.	Brimson <i>et al.</i> , (2022)
<i>Capsicum annuum</i> L.	Chilli pepper (E)	Solanaceae	Traditional fermented red pepper paste is consumed as it is effective on cholesterol modulation and body weight management.	Sanati <i>et al.</i> , (2018)
<i>Casearia sylvestris</i> Sw.	Wild coffee (E)	Salicaceae	The leaves and stem bark are steeped in water to make a herbal drink and consumed.	Junior and Almeida, (2017)
<i>Caralluma fimbriata</i> Wall.	Caralluma (E)	Apocynaceae	The fleshy, leafless stems of the succulent plant are chopped and chewed raw. It is also used to make condiments such as	Arora <i>et al.</i> , (2015)

			chutneys and pickles.	
<i>Coix lacryma-jobi</i> L.	Adlay millet (E)	Poaceae	The polished grains are incorporate into daily meals, such as soups, porridges or beverages.	Morya <i>et al.</i> , (2022)
<i>Curcuma longa</i> L.	Turmeric (E)	Zingiberaceae	The powder of rhizome is mixed with water, or milk and then consumed and consumed.	Lee <i>et al.</i> , (2025)
<i>Cymbopogon citratus</i> (DC.) Stapf	Lemongrass (E)	Poaceae	The leaves are used to make a tea as drink or essential oil made from leaves is used.	Aly <i>et al.</i> , (2024)
<i>Garcinia gummi-gutta</i> (L.) Robson	Malabar tamarind (E)	Clusiaceae	A drink often prepared from the dried fruit rind is consumed.	Anilkumar <i>et al.</i> , (2023)
<i>Geranium nepalense</i> Sweet	Bhanda (H)	Geraniaceae	The plant parts used for reducing fat accumulation in cells.	Junior and Almeida, (2017)
<i>Hibiscus sabdariffa</i> L.	Indian sorrel (E)	Malvaceae	The dried calyces are boiled with water to produce a popular, tart-flavoured drink is consumed.	Ferreira <i>et al.</i> , (2025)
<i>Moringa oleifera</i> Lam.	Drum stick (E)	Moringaceae	The dried moringa leaves are ground into a fine powder is steeped in hot	Kilany <i>et al.</i> , (2020)

			water to make tea, blended into smoothies or shakes.	
<i>Myristica fragrans</i> Houtt.	Nutmeg (E)	Myristicaceae	The seed and mace have anti-obesity effect.	Yakaiah <i>et al.</i> , (2019)
<i>Nigella sativa</i> L.	Black cumin (E)	Ranunculaceae	The ground seed powder is taken directly, often mixed with warm water, honey or other herbal teas to create a morning tonic.	Adam <i>et al.</i> , (2023)
<i>Nelumbo nucifera</i> Gaertn.	Sacred lotus (E)	Nelumbonaceae	The dried leaves are steeped into hot water to make a beverage is consumed.	Huang <i>et al.</i> , (2024)
<i>Neolitsea cassia</i> (L.) Kosterm.	Wild cinnamon (E)	Lauraceae	The leaves or seeds are steeped in hot water and consumed as tea.	Alsoodeeri <i>et al.</i> , (2020)
<i>Panax japonicus</i> (T.Nees) C.A.Mey.	Aralia japonica root	Araliaceae	The rhizome extract is prepared as a drink consumed orally.	Xue <i>et al.</i> , (2024)
<i>Phaseolus vulgaris</i> L.	French bean (E)	Fabaceae	Cooked beans are incorporated into the regular diet as a source of fibre and protein.	Celleno <i>et al.</i> , (2007)
<i>Piper nigrum</i> L.	Black pepper (E)	Piperaceae	A pinch of black pepper powder is used in warm	Du <i>et al.</i> , (2020)

			water, lemon water or as herbal teas.	
<i>Senna alexandrina</i> Mill.	Indian senna	Fabaceae	Steep 1-2 grams of dried leaves in hot water for about 10 minutes and consumed as a tea.	Yuniarto <i>et al.</i> , (2018)
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Beach almond (E)	Combretaceae	1 teaspoon of dried fruit powder with warm water at night before sleep is consumed orally.	Makihara <i>et al.</i> , (2012)
<i>Trigonella foenum-graecum</i> L.	Fenugreek (E)	Fabaceae	The seeds are soaked overnight and consumed them along with water in the morning regularly.	Jahan <i>et al.</i> , (2024)
<i>Triticum aestivum</i> L.	Wheat (E)	Poaceae	The young, leafy blades are juiced and consumed orally.	Luyen <i>et al.</i> , (2015)

(E: English; H: Hindi)

Biotechnological approaches

Molecular marker assisted selection, accelerates the identification and breeding of medicinal plant varieties with higher concentrations of anti-obesity phytochemicals, improving therapeutic consistency. Omics approaches facilitate understanding of bioactive compounds biosynthesis, mechanisms of action and metabolic pathways, supporting rational development of plant-based interventions.

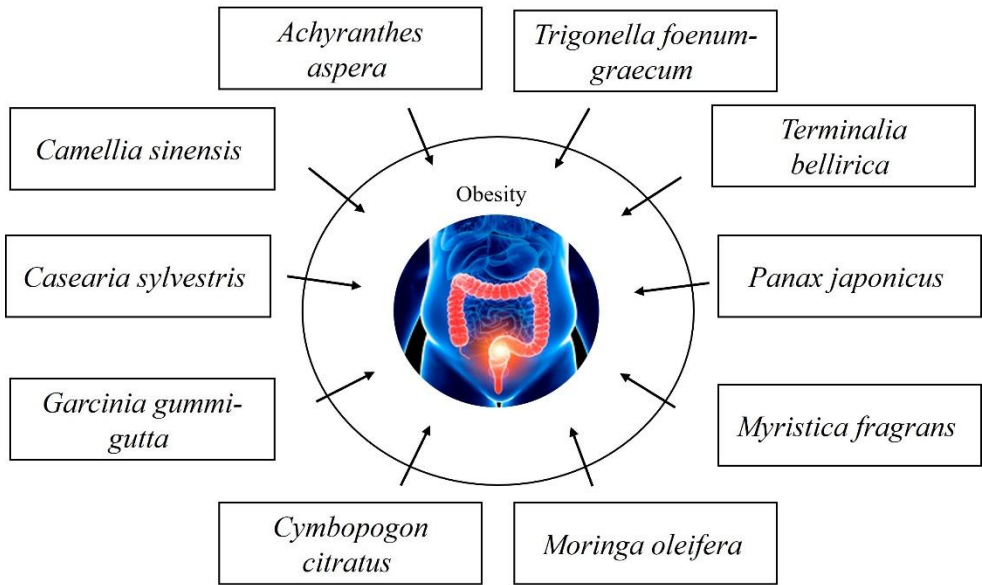


Figure 1: Some common medicinal plants traditionally used to reduce obesity

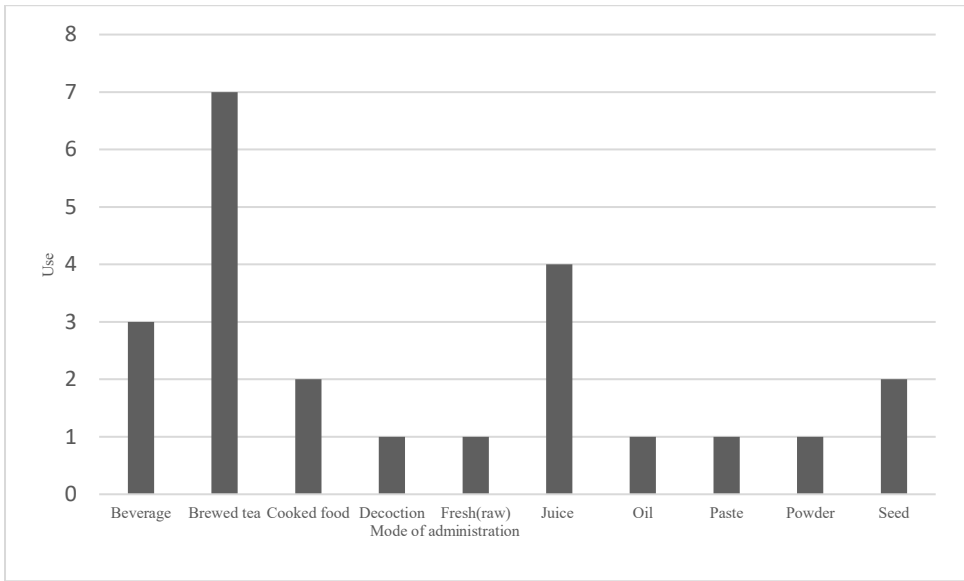


Figure 2: Medicinal plants used in different mode of administration

Conclusion

The present investigation of medicinal plants traditionally used for obesity relief highlighted the remarkable diversity and therapeutic potential of botanical resources in metabolic health management. Despite this potential, the variability in traditional preparation techniques and

limited clinical data for several species underscore the need for more systematic, evidence-based investigations. Future research should aim to identify key bioactive compounds, determine optimal dosages and establish safety profiles to support their integration into modern therapeutic frameworks. The ethnobotanical wisdom with contemporary scientific inquiry, these natural agents may contribute meaningfully to holistic, sustainable strategies for weight management and metabolic well-being.

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