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Cardioprotective Potentials of Medicinal Plants: An Integrative Review of Herbal Interventions in Cardiovascular Disorders

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ABSTRACT

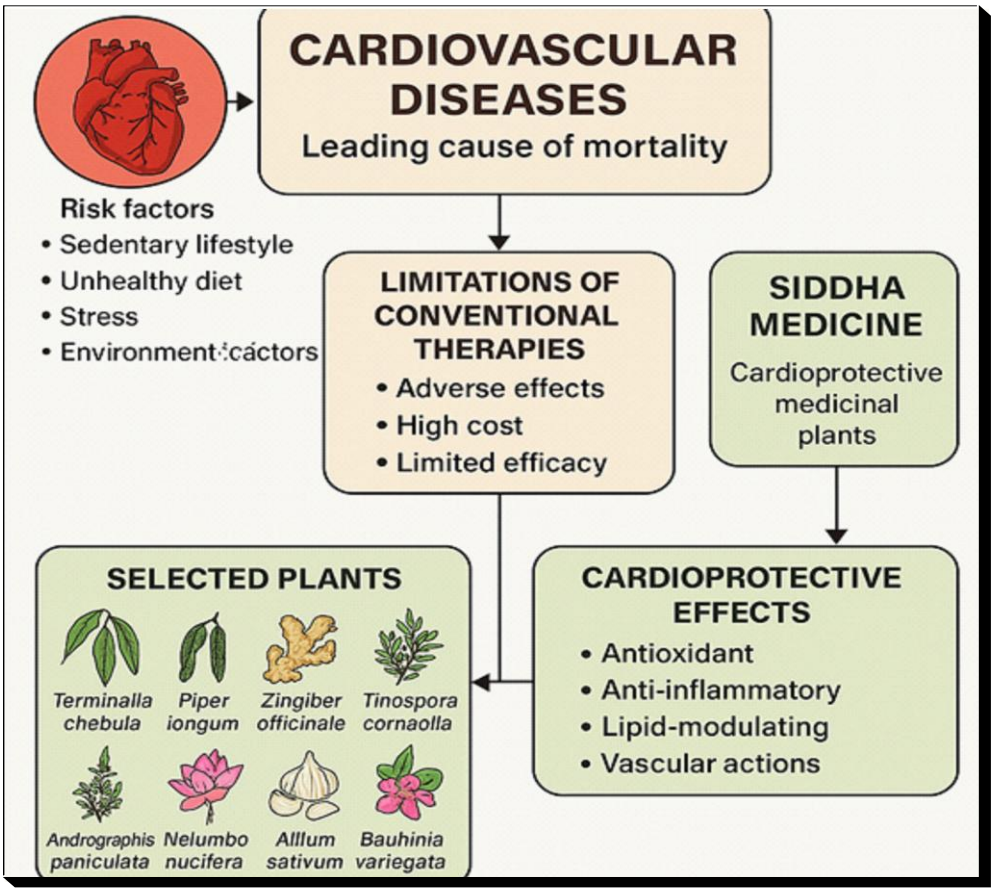
Cardiovascular diseases (CVDs) remain the leading cause of mortality globally, largely attributed to sedentary lifestyles, unhealthy diets, psychological stress, and environmental factors. Although conventional pharmacological therapies exist, they often carry drawbacks such as adverse effects, high cost, and limited long-term efficacy. Traditional medicine systems—especially Siddha, an ancient Dravidian practice—offer promising botanical alternatives with cardioprotective potential. Siddha formulations, historically documented in palm-leaf manuscripts, incorporate numerous herbs with demonstrated cardiovascular benefits. This review comprehensively explores the cardioprotective efficacy of various medicinal plants, focusing on their phytoconstituents, pharmacological actions, and mechanisms of action. Plants such as *Terminalia chebula*, *Piper longum*, *Zingiber officinale*, *Tinospora cordifolia*, *Asparagus racemosus*, *Andrographis paniculata*, *Nelumbo nucifera*, *Allium sativum*, and *Bauhinia variegata* have shown significant effects in preclinical and clinical studies. Other botanicals like *Azadirachta indica*, *Bacopa monnieri*, *Curcuma longa*, *Hygrophila auriculata*, *Nigella sativa*, *Ocimum basilicum*, *Terminalia arjuna*, *Withania somnifera*, and *Tribulus terrestris* also exhibit therapeutic potential against myocardial infarction, hypertension, atherosclerosis, arrhythmias, and doxorubicin-induced cardiotoxicity. This review emphasizes the phytochemical richness and multi-targeted mechanisms of these herbs—ranging from antioxidant and anti-inflammatory actions to modulation of lipid profiles and vascular function. With nearly 80% of the global population relying on traditional medicine, integrating validated plant-based remedies into mainstream cardiovascular care could provide safer, more affordable, and holistic options for the prevention and management of CVDs.

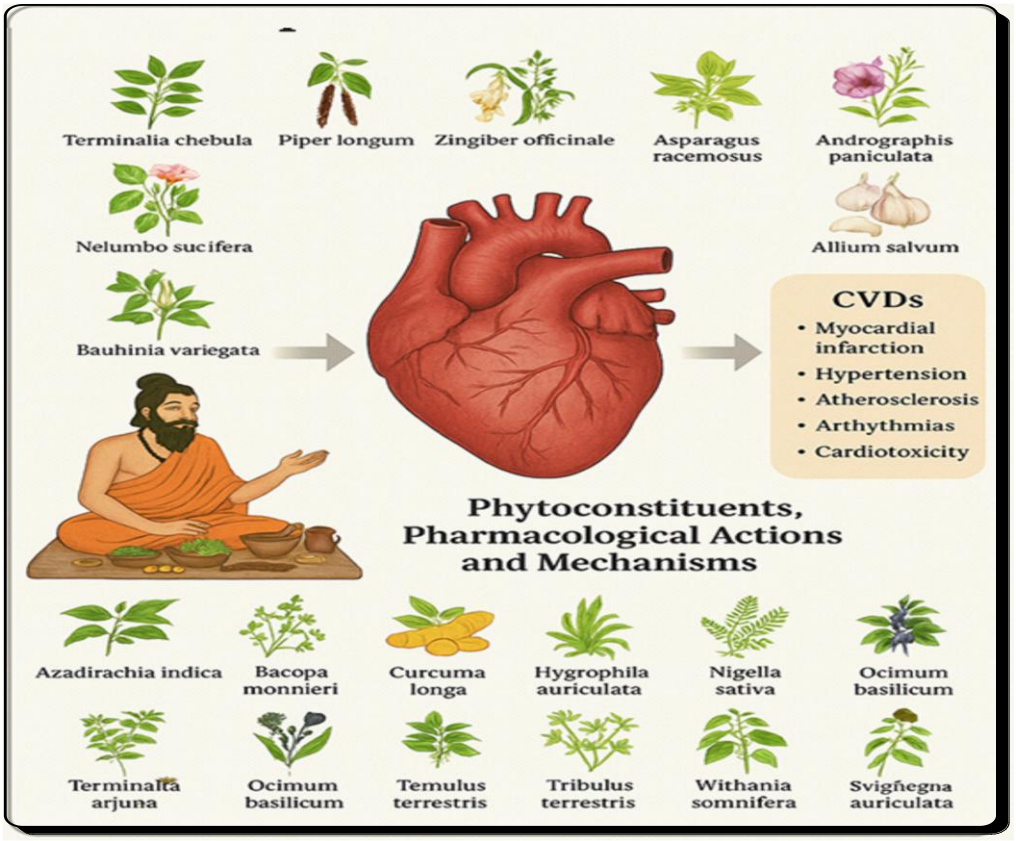
Keywords: *Siddha medicine, cardioprotective herbs, cardiovascular diseases, medicinal plants, myocardial infarction, Terminalia arjuna, garlic (Allium sativum), Tribulus terrestris, phytoconstituents, traditional herbal therapy.*

1. INTRODUCTION

Cardiovascular diseases (CVDs) are among the foremost causes of morbidity and mortality worldwide, exerting a significant burden on healthcare systems and economic resources. The cardiovascular system, comprising the heart and a network of blood vessels, is responsible for transporting oxygen, nutrients, hormones, and metabolic waste across tissues. Any disruption in this system can result in severe consequences, including myocardial infarction (MI), stroke, heart failure, and sudden cardiac death (World Health Organization, 2021). CVD encompasses a spectrum of disorders such as coronary artery disease (CAD), MI, hypertension, congenital heart disease, arrhythmias, cardiomyopathies, and peripheral arterial disease (Roth et al., 2020). Major risk factors contributing to CVD include tobacco use, poor dietary habits, sedentary lifestyles, obesity, diabetes mellitus, dyslipidemia, and chronic stress (Benjamin et al., 2019).

According to the World Health Organization, an estimated 17.9 million people died from CVDs in 2019, representing 32% of all global deaths. This figure is projected to rise to 23.6 million deaths annually by 2030 without effective intervention (WHO, 2021). Developing countries like India face a disproportionately high burden due to rapid urbanization, westernized diets, and limited access to quality healthcare (Gaziano et al., 2010; Kaur et al., 2018).


CARDIOVASCULAR DISEASES
Leading cause of mortality
Risk factors
• Sedentary lifestyle
• Unhealthy diet
• Stress
• Environment factors
LIMITATIONS OF CONVENTIONAL THERAPIES
• Adverse effects
• High cost
• Limited efficacy
SIDDHA MEDICINE
Cardioprotective medicinal plants
SELECTED PLANTS
Terminalia chebula
Piper iongum
Zingiber officinale
Tinospora cornaolla
Andrographis paniculata
Nelumbo nucifera
Alllum sativum
Bauhinia variegata
CARDIOPROTECTIVE EFFECTS
• Antioxidant
• Anti-inflammatory
• Lipid-modulating
• Vascular actions


Terminalia chebula
Piper longum
Zingiber officinale
Asparagus racemosus
Andrographis paniculata
Nelumbo sucifera
Allium salvum
Bauhinia variegata
CVDs
• Myocardial infarction
• Hypertension
• Atherosclerosis
• Arthythmias
• Cardiotoxicity
Phytoconstituents, Pharmacological Actions and Mechanisms
Azadirachia indica
Bacopa monnieri
Curcuma longa
Hygrophila auriculata
Nigella sativa
Ocimum basilicum
Terminalia arjuna
Ocimum basilicum
Temulus terrestris
Tribulus terrestris
Withania somnifera
Svigñegna auriculata

Cardioprotection refers to the preservation of cardiac structure and function by mitigating oxidative, ischemic, or metabolic injury. While conventional pharmacotherapy—utilizing β-blockers, ACE inhibitors, calcium channel blockers, and statins—plays a vital role in managing CVDs, these drugs are often associated with high costs, adverse reactions, and limited accessibility in low-resource settings (Yusuf et al., 2004). In contrast, medicinal plants have been utilized for centuries in traditional systems like Siddha, Ayurveda, and Traditional Chinese Medicine. These systems emphasize holistic care using botanicals rich in phytochemicals with cardioprotective activity. Bioactive compounds such as flavonoids, alkaloids, polyphenols, saponins, glycosides, and terpenoids have demonstrated lipid-regulating, antioxidant, and anti-inflammatory effects (Pandey et al., 2013; Goyal et al., 2021). Experimental models—such as isoproterenol- or doxorubicin-induced cardiotoxicity and ischemia-reperfusion injury in rodents—have validated the cardioprotective properties of many plant extracts. These effects are mediated through the modulation of biochemical markers like SGPT, SGOT, LDH, CPK, total cholesterol, LDL, HDL, triglycerides, and antioxidant enzymes including SOD, CAT, GSH, and GPx (Bhatia et al., 2010; Sharma et al., 2022).

This review aims to explore the global burden of CVDs and highlight the pharmacological potential of medicinal plants in cardioprotection (Table 1). Emphasis is placed on phytochemical mechanisms of action, preclinical and clinical evidence, and therapeutic relevance in modern cardiovascular care.

Table 1: Ayurvedic Herbs Used in Cardiovascular Disease.

Condition	Name of the Plants
Herbs Which Decrease Blood Pressure	*Rauwolfia serpentina* (Sarpagandha), *Fumaria indica* (Parpata), *Daucus carota* (Carrot seeds), *Cassia absus* (Chaksu), *Acorus calamus* (Vacha)
Herbs Which Are Diuretic	*Tribulus terrestris* (Gokshura), *Boerhaavia diffusa* (Punarnava), *Phyllanthus niruri* (Bhumi amalaki), *Tinospora cordifolia* (Guduchi), *Taraxacum officinale* (Dandelion)
Herbs Which Reduce Serum Cholesterol	*Commiphora mukul* (Guggulu)
Herbs Acting as Cardiac Tonics	*Terminalia arjuna* (Arjuna), *Saussurea lappa* (Kushtha), *Sida cordifolia* (Bala), *Digitalis purpurea* (Foxglove)
Herbs That Decrease Platelet Aggregation	*Allium sativum* (Garlic)
Herbs With Anti-Stress/ General Tonic Properties	*Withania somnifera* (Ashwagandha), *Bacopa monnieri* (Brahmi), *Evolvulus alsinoides* (Shankhpushpi)

Therapeutic Evaluation of Cardioprotective Medicinal Plants

A multitude of medicinal plants have demonstrated cardioprotective effects supported by traditional knowledge and contemporary scientific validation. These effects are exerted through multiple mechanisms, including antioxidant activity, lipid-lowering action, anti-inflammatory effects, vasodilation, antiplatelet aggregation, cardiotonic properties, and nitric oxide modulation (Upaganlawar et al., 2011; Shrivastava & Banerjee, 2024). Notably, Terminalia arjuna (Arjuna), Allium sativum (garlic), Withania somnifera (Ashwagandha), and Commiphora mukul (Guggul) are well-documented examples. T. arjuna is known for its cardiotonic and anti-anginal properties, attributed to bioactive compounds such as arjunolic acid and flavonoids (Dwivedi et al., 2005). Allium sativum has demonstrated lipid-lowering, antihypertensive, and antiplatelet properties, primarily due to sulfur-containing compounds like allicin (Rahman, 2007). Withania somnifera reduces oxidative stress and enhances cardiac resilience, especially under chronic stress conditions (Bhattacharya et al., 2011). Pharmacological studies have revealed that these botanicals act on multiple targets—scavenging reactive oxygen species (ROS), suppressing pro-inflammatory cytokines (TNF-α, IL-6), enhancing eNOS expression, modulating lipid metabolism, and improving mitochondrial function (Khan et al., 2021; Chaudhary et al., 2023). Herbs such as Tribulus terrestris (Gokshura), Tinospora cordifolia, Azadirachta indica, and Zingiber officinale offer protection against myocardial ischemia, oxidative injury, and doxorubicin-induced cardiomyopathy due to their polyphenolic and terpenoid constituents (Sahu et al., 2023; Singh et al., 2023).

The Siddha system of medicine remains a rich repository of such cardioprotective herbs, offering empirical and textual validation over centuries (Table 2). However, challenges such as standardization, pharmacokinetic profiling, and clinical

validation remain (Goyal et al., 2021). Integrating medicinal plants into mainstream cardiovascular care may reduce drug burden, minimize side effects, and offer affordable alternatives in low-resource settings. Future directions must focus on mechanistic studies, well-designed clinical trials, and safety profiling to ensure efficacy and reproducibility (Soni et al., 2024; Alam et al., 2025).

Table 1: Cardioprotective Medicinal Plants and Their Properties.

S. No.	Botanical Name	Common Name	Family	Key Phytochemicals	Cardioprotective Activity	References
1	Allium sativum	Garlic	Amaryllidaceae	Organosulfur compounds (allicin)	Lowers LDL, improves endothelial function, antihypertensive, anti-atherosclerotic	Singh et al., 2006; Banerjee SK et al., 2002
2	Andrographis paniculata	Kalmegh	Acanthaceae	Andrographolide	Protects cardiac myocytes from hypoxia-induced injury	Thakur et al., 2012; Singh et al., 2015
3	Ananas comosus	Pineapple	Bromeliaceae	Bromelain, Vitamins A/C	Reduces oxidative stress in isoproterenol-induced myocardial infarction	Saxena & Bardia, 2013; Saxena et al., 2013
4	Arachis hypogaea	Peanut	Fabaceae	Resveratrol	Prevents oxidative stress-induced myocardial damage and inflammation	Karthik et al., 2011
5	Artocarpus heterophyllus	Jackfruit	Moraceae	Flavonoids, phenolic acids	Antioxidant and myocardial protective effects	Santhi et al., 2011
6	Asparagus racemosus	Shatavari	Asparagaceae	Shatavarins (saponins)	Reduces serum lipids, prevents atherosclerosis	Alok et al., 2013; Panda et al., 2006
7	Azadirachta indica	Neem	Meliaceae	Nimbin, nimbolide	Antioxidant, hypolipidemic effects	Kaur et al., 2005
8	Bacopa monnieri	Brahmi	Plantaginaceae	Bacosides A & B	Cardioprotective via antioxidant pathways	Kongkeaw et al., 2014
9	Bauhinia variegata	Mountain Ebony	Fabaceae	Saponins, flavonoids	Enhances Na^+/K^+ ATPase activity, antiarrhythmic	Kumar et al., 2010
10	Boerhavia diffusa	Punarnava	Nyctaginaceae	Alkaloids, rotenoids	Cardioprotective, diuretic, anti-inflammatory	Jadon et al., 2007
11	Bryophyllum pinnatum	Air Plant	Crassulaceae	Bufadienolides, flavonoids	Cardiotonic, antioxidant	Jadon et al., 2007
12	Camellia sinensis	Green Tea	Theaceae	Catechins (EGCG)	Antioxidant, endothelial protection	Kumar et al., 2012
13	Carissa opaca	Wild Karonda	Apocynaceae	Flavonoids, phenolics	Reverses CCl_4-induced myocardial injury via antioxidant restoration	Sahreen et al., 2011
14	Cassia tora	Sickle Senna	Caesalpiniaceae	Anthraquinones, flavonoids	Protects against isoproterenol/doxorubicin-	Nagarathna et al., 2016;

					induced oxidative damage	Koshma et al., 2019
15	Centaurea behen	Behen Root	Asteraceae	Phenolics, flavonoids	Cardioprotective, antioxidant	Kumar et al., 2012
16	Cinnamomum tamala	Indian Bay Leaf	Lauraceae	Cinnamaldehyde, monoterpenes	Attenuates doxorubicin-induced cardiotoxicity	Nagaraju et al., 2015
17	Commiphora mukul	Guggul	Burseraceae	Guggulsterones	Lipid-lowering, anti-inflammatory; used in hyperlipidemia/atherosclerosis	Sandhya et al., 2000
18	Coriandrum sativum	Coriander	Apiaceae	Flavonoids, glycosides	Protects against salbutamol-induced cardiac stress	Kousar et al., 2012
19	Cornus mas	Cornelian Cherry	Cornaceae	Antioxidants	Restores antioxidant enzymes, limits ISO-induced damage	Eshaghi et al., 2011
20	Crataegus monogyna	Hawthorn	Rosaceae	Flavonoids, procyanidins	Positive inotropy, antiarrhythmic	Kousar et al., 2012
21	Croton sparsiflorus	Croton	Euphorbiaceae	Flavonoids, alkaloids	Significant cardioprotection in oxidative stress models	Beaulah et al., 2015
22	Curcuma longa	Turmeric	Zingiberaceae	Curcumin, demethoxycurcumin, cineole	Antioxidant, anti-inflammatory; protects in cardiotoxicity/MI models	Aggarwal et al., 2007; El-Sayed & Abd El-Fattah, 2017
23	Cynara scolymus	Artichoke	Asteraceae	Chlorogenic acid, cynarin	Reduces LDL/total cholesterol in clinical trials	Gail et al., 1998
24	Cyperus rotundus	Nut Grass	Cyperaceae	Phenolics, flavonoids	Reverses isoproterenol-induced cardiotoxicity	Nazish Jahan et al., 2019
25	Digitalis purpurea	Foxglove	Plantaginaceae	Cardiac glycosides (digoxin)	Positive inotropy for congestive heart failure (narrow therapeutic index)	Stuhlemmer et al., 1993
26	Embelia ribes	Vidanga	Primulaceae	Embelin, alkaloids	Reduces oxidative cardiac damage in diabetic models	Maurya et al., 2012; Ghosh et al., 2014
27	Emblica officinalis	Amla	Phyllanthaceae	Gallic acid, emblicanin	Hypolipidemic, antioxidant	Ahmed et al., 2010
28	Ficus racemosa	Cluster Fig	Moraceae	Polyphenols	Attenuates doxorubicin-induced cardiac injury	Ahmed et al., 2010
29	Garcinia indica	Kokum	Clusiaceae	Garcinol, xanthones	Reduces lipid peroxidation, antioxidant	Hegde et al., 2014
30	Garcinia pedunculata	-	Clusiaceae	Garcinol	Cardioprotective in rat models	Kannan et al., 2012
31	Ginkgo biloba	Ginkgo	Ginkgoaceae	Ginkgolides,	Antioxidant, neuro-/cardioprotective, improves	Kleijnen et al., 1992;

				flavonoids	blood flow	Gupta et al., 1997
32	Gymnema sylvestre	Gurmar	Apocynaceae	Gymnemic acids	Anti-obesity, hypolipidemic, antihypertensive	Kumar et al., 2012
33	Hibiscus sabdariffa	Roselle	Malvaceae	Gossypetin, anthocyanins	Improves cardiac function/antioxidant status in hypertensive/MI models	Obouayeba et al., 2012
34	Hygrophila auriculata	-	Acanthaceae	Sterols, alkaloids	Cardioprotection via antioxidant/enzyme regulation	Koti et al., 2009
35	Justicia tranquebariensis	Water Willow	Acanthaceae	Umbelliferone, flavonoids	Prevents oxidative myocardial injury	Radhika & Sundarraj, 2010
36	Lagenaria siceraria	Bottle Gourd	Cucurbitaceae	Flavone-C glycosides, sterols	Protects against ISO-induced cardiotoxicity	Upaganlawar et al., 2010
37	Lavandula angustifolia	Lavender	Lamiaceae	Cineole, limonene	Maintains cardiac histoarchitecture, reduces lipid peroxidation	Ziaee et al., 2014
38	Lepidium sativum	Garden Cress	Brassicaceae	Flavonoids, minerals	Improves myocardial tissue function	Mohamed et al., 2017
39	Mangifera indica	Mango	Anacardiaceae	Mangiferin, quercetin	Antioxidant, restores lipid profiles, protects myocardial tissue	Awari et al., 2009; Prabhu et al., 2011
40	Medicago sativa	Alfalfa	Fabaceae	Vitamins A/C/E, flavonoids	Antioxidant, anti-inflammatory	Gomathi et al., 2014
41	Momordica charantia	Bitter Melon	Cucurbitaceae	Triterpenoids, cucurbitins	Dose-dependent protection against oxidative stress/inflammation	Temitope et al., 2019
42	Moringa oleifera	Drumstick Tree	Moringaceae	Alkaloids, saponins, polyphenols	Decreases MI markers, improves cardiac enzymes	Oseni et al., 2015
43	Nardostachys jatamansi	Spikenard	Caprifoliaceae	Jatamansone, sesquiterpenes	Antiarrhythmic, cardioprotective	Tripathi et al., 2011
44	Nelumbo nucifera	Lotus	Nymphaeaceae	Nuciferine, kaempferol, quercetin	Antiarrhythmic, membrane-stabilizing; attenuates oxidative stress	Zhao et al., 2006; Pillai et al., 2010; Kirithika et al., 2012
45	Newbouldia laevis	African Border Tree	Bignoniaceae	Tannins, cardiac glycosides	Protects against cardiotoxicity via antioxidant/anti-inflammatory effects	Agbafor et al., 2012
46	Nigella sativa	Black Cumin	Ranunculaceae	Thymoquinone	Antioxidant, lipid-lowering; reduces myocardial necrosis/lipid peroxidation	Shafiq et al., 2014

47	Ocimum basilicum	Sweet Basil	Lamiaceae	Rosmarinic acid, flavonoids	Protective against MI, antioxidant	Hosseinzadeh et al., 2015;
48	Ocimum sanctum	Tulsi	Lamiaceae	Eugenol, orientin	Cardioprotective, hypolipidemic, antioxidant	Bharani et al., 2002; Arya et al., 2006
49	Panax ginseng	Ginseng	Araliaceae	Ginsenosides	Anti-ischemic, vasodilatory, cardiotonic	Fathiazad et al., 2011
50	Parkia biglobosa	African Locust Bean	Fabaceae	Flavonoids, glycosides	Restores antioxidant enzymes	Komolafe et al., 2015
51	Phyllanthus emblica	Indian Gooseberry	Phyllanthaceae	Tannins, polyphenols	Anti-atherosclerotic, antioxidant	Jacob et al., 2010
52	Picrorhiza kurroa	Katuki	Plantaginaceae	Kutkin, picrosides	Cardiac tonic, anti-inflammatory	Pintu et al., 2014
53	Piper longum	Long Pepper	Piperaceae	Piperine, piperlongumine	Mitigates adriamycin-induced cardiotoxicity	Anandan et al., 2007
54	Pithecellobium dulce	Manila Tamarind	Fabaceae	Saponins, polyphenols	Reverses ISO-induced myocardial damage	Bhavani et al., 2013
55	Pongamia pinnata	Indian Beech	Fabaceae	Flavonoids, cardiac glycosides	Cardiotonic, myocardial protective	Thengjam et al., 2021
56	Punica granatum	Pomegranate	Lythraceae	Punicalagin, ellagic acid	Antioxidant, hypotensive	Shigematsu et al., 2001
57	Raphanus sativus	Radish	Brassicaceae	Glucosinolates, anthocyanins	Reduces oxidative stress/lipid peroxidation	Shah et al., 2015
58	Rubia cordifolia	Indian Madder	Rubiaceae	Anthraquinones	Reduces MI, improves antioxidant enzymes	Bhatt et al., 2014
59	Salvia miltiorrhiza	Danshen	Lamiaceae	Tanshinones, salvianolic acids	Anti-ischemic, coronary vasodilation	Zhau et al., 2006
60	Stachys schimperi	Hedge Nettle	Lamiaceae	Isoscutellarein glycosides	Inhibits lipid peroxidation/myocardial degeneration	Abdel-Sattar et al., 2016
61	Syzygium aromaticum	Clove	Myrtaceae	Eugenol, β-caryophyllene	Anti-ischemic, antioxidant	Rabadia et al., 2013
62	Tamarindus indica	Tamarind	Fabaceae	Alkaloids, flavonoids	Reduces infarction area, improves antioxidant defenses	Kinattingal et al., 2014
63	Terminalia arjuna	Arjuna	Combretaceae	Arjunic acid, tannins, flavonoids	Cardiac tonic, coronary vasodilator, antioxidant; improves cardiac output	Sumitra et al., 2001; Sivakumar et al., 2010
64	Terminalia chebula	Haritaki	Combretaceae	Tannins, chebulagic acid, gallic acid	Reduces lipid peroxidation, improves cardiac markers in MI	Sabu et al., 2002; Jadon et al., 2007; Naik et al., 2004
65	Tinospora	Guduchi	Menispermace	Berberine,	Attenuates isoprenaline-	Mathew et

	cordifolia		ae	tinosporol, glycosides	induced MI; enhances antioxidant systems	al., 2009; Saha et al., 2011; Kesarwani et al., 2011
66	Trichopus zeylanicus	Arogyapacha	Dioscoreaceae	Phytosterols, glycosides	Regulates myocardial antioxidant enzymes	Velavan et al., 2010
67	Vitis labrusca	Fox Grape	Vitaceae	Polyphenols, anthocyanins	Reduces myocardial lipid peroxidation	Oliboni et al., 2011
68	Withania somnifera	Ashwagandha	Solanaceae	Withanolides, withaferin A	Reduces myocardial oxidative stress, modulates inflammation	Tripathi et al., 1996
69	*Zingiber officinale*	Ginger	Zingiberaceae	Gingerol, shogaols	Protects myocardium from ischemic injury, inhibits lipid peroxidation, enhances cardiac enzyme activity, and modulates nitric oxide and cytokine production.	Alok et al., 2013

Medicinal Plants with Cardioprotective Effects

A wide range of medicinal plants have demonstrated promising cardioprotective effects through diverse mechanisms, including antioxidant activity, lipid-lowering, anti-inflammatory, diuretic, vasodilatory, and cardiotonic properties. Notable botanicals such as Terminalia arjuna, Allium sativum, Withania somnifera, and Commiphora mukul are well-supported by both traditional usage and modern clinical research. Continued investigation—particularly controlled clinical trials and standardization of phytochemical extracts—is essential to fully harness their therapeutic potential in the management of cardiovascular diseases (Goyal et al., 2021; Khan et al., 2021; Patel et al., 2022; Rani,t al., 2022; Soni et al., 2024). Among these, garlic (Allium sativum) is extensively studied for its antihypertensive, hypolipidemic, antiplatelet, and antioxidant effects. The key active compound, allicin, is enzymatically produced when garlic is crushed but is unstable and heat-sensitive, which can reduce its efficacy upon cooking (Rahman et al., 2003; Amagase et al., 2001). Supplementation with aged garlic extract (AGE) at a dose of 7.2 g/day for six months has been shown to significantly reduce total cholesterol by 6–7% and LDL cholesterol by approximately 4–4.6% (Steiner et al., 1996; Yeh & Liu, 2001). AGE has also been shown to enhance the resistance of LDL to oxidative damage, further supporting its cardioprotective antioxidant effects (Steiner et al., 1998; Ide & Lau, 1998). Meta-analyses corroborate these findings, with reported reductions in total cholesterol by approximately 9% and LDL by 10% (Silagy & Neil, 1994; Yeh & Liu, 2001). However, excessive intake may lead to mild gastrointestinal discomfort and can potentiate the effects of anticoagulants (Yeh et al., 2001).

Tribulus terrestris, another cardioprotective herb, exhibits antihypertensive, cardiotonic, and vasodilatory activities. The presence of steroidal saponins enhances nitric oxide bioavailability, inhibits angiotensin-converting enzyme (ACE) activity, and relaxes vascular smooth muscle, thereby improving coronary circulation and reducing blood pressure (Adimoelja, 2000; Mokashi et al., 2013). Preclinical studies have further demonstrated its protective role against myocardial infarction and oxidative cardiac injury (Kumar et al., 2011). Terminalia arjuna, a cornerstone in Ayurvedic medicine, is renowned for its cardiotonic, anti-anginal, antioxidant, and anti-inflammatory properties. Key constituents such as arjunolic acid and flavonoids contribute to its therapeutic profile by enhancing myocardial contractility, scavenging reactive oxygen species (ROS), protecting against ischemic injury, and inhibiting platelet aggregation (Gupta et al., 2001). Clinical studies have reported significant improvements in anginal symptoms, left ventricular function in heart failure, and lipid profile regulation following T. arjuna administration (Dwivedi et al., 1997; Mishra et al., 2010; Chander et al., 2015). Together, these medicinal plants exemplify the phytochemical richness and multifaceted mechanisms underlying herbal cardioprotection. Their ability to modulate nitric oxide pathways, inhibit platelet aggregation, regulate lipid metabolism, and counteract oxidative stress supports their role as effective complementary agents in cardiovascular care. Integrating Allium sativum, Tribulus terrestris, and Terminalia arjuna into preventive and adjunctive strategies may significantly enhance cardiovascular outcomes. However, standardization of formulations, dosage optimization, and high-quality clinical trials remain imperative to ensure safety, efficacy, and therapeutic consistency (Shrivastava & Banerjee, 2024; Alam et al., 2025).

2. CONCLUSION

This review highlights the cardioprotective potential of various medicinal plants, particularly those utilized in the Siddha system of medicine. It is evident that diet and lifestyle, when combined with the regular use of certain herbs, can play a significant role in the prevention and management of cardiovascular diseases. Plants such as Arjuna, Garlic, and Gokshura possess well-documented cardiotonic and cardioprotective properties, including antihypertensive, antiarrhythmic, lipid-lowering, diuretic, and vasodilatory effects. The bioactive constituents found in these plants, such as flavonoids, cardiac glycosides, and polyphenolic compounds, contribute significantly to their therapeutic effects and serve as leads for further pharmacological and clinical research. The compilation of these herbal medicines provides a valuable foundation for future exploration in both experimental and clinical settings. Given the rising prevalence of cardiovascular diseases and the limitations of current pharmacotherapies, there is a pressing need to validate and incorporate plant-based remedies through evidence-based approaches. This review thus serves as a resource to guide future research and therapeutic strategies, with the ultimate aim of reducing cardiovascular morbidity and mortality.

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