



A Review on *Terminalia arjuna*: Phytochemistry and Pharmacological Potential

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Article info

Received: 18/04/2026

Revised: 22/05/2026

Accepted: 13/06/2026

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Abstract

Since ancient time, *Terminalia arjuna* is has been used for to help with heart problems and other health issues. preview study looks at how Terminalia arjuna can help with things like cholesterol and other metabolic problems. Terminalia arjuna has things in it like flavonoids, tannins and triterpenoids that're good for you. These things can help lower cholesterol and raise good cholesterol. They can also help stop stress and inflammation. The bark of the plant is rich in things like flavonoids and phenolic compounds. This means Terminalia arjuna might be a natural way to help with heart health and other problems. This makes it a good natural remedy for heart and metabolic problems. More research is being done on Terminalia arjuna. This includes using nanotechnology to make medicines. The results are. Show that Terminalia arjuna can be used in new and exciting ways.

Keywords: Dyslipidemia, , Flavonoids, Tannins, Triterpenoids, Lipoprotein

Introduction

Plant-based remedies for cardiovascular and metabolic disorders have been extensively integrated into traditional medicinal systems (TMS) of the Indian subcontinent as part of an effort to maintain physiological homeostasis and health through natural agents with cardiogenic properties. Out of these terminalia arjuna is one among the medicinal plants which have great therapeutic potential mentioned in classical text like Charaka Samhita and Sushruta Samhita for treating heart related disorders. The terminal bark of this tree (*Terminalia arjuna*) has been extensively used for the treatment of cardiac malfunctions and to modulate lipid metabolism. Recent studies show that it also has bioactive compounds including flavonoids and tannins and triterpenoids, giving it antioxidant, supporting endothelial function, reducing oxidative stress, modulating inflammatory pathways, enhancing myocardial energy metabolism and maintaining cardiac rhythm which is essential for integrated cardiovascular health and preventing progressive heart disease. Additionally, it helps in improving

blood circulation, strengthening cardiac muscles, balancing cholesterol levels, protecting against cellular damage, and supporting long-term heart health.

History and Location

Terminalia arjuna has been used in India for over 2000 years. It is mentioned in books like Charaka Samhita and Sushruta Samhita as a way to help with heart problems. The name Arjuna comes from a hero in a story and it means strength and endurance. Terminalia arjuna grows in places, including India, Nepal, Sri Lanka and Bangladesh. It likes to grow near rivers and in forests.

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Fig. 1: Plant of *T. arjuna*

Taxonomical Classification

- **Kingdom:** Plantae
- **Subkingdom:** Tracheobionta (Vascular plants)
- **Division:** Magnoliophyta (Angiosperms)
- **Class:** Magnoliopsida (Dicotyledons)
- **Order:** Myrtales
- **Family:** Combretaceae
- **Genus:** Terminalia
- **Species:** *arjuna*

Botanical Description of *Terminalia arjuna*

Terminalia arjuna is a big tree that loses its leaves. It is part of the Combretaceae family. *Terminalia arjuna* can grow up to 20 to 30 meters high. You can usually find *Terminalia arjuna* near rivers in flood areas and in forests that're always moist.

Bark:- *Terminalia arjuna* has a bark. The bark of *Terminalia arjuna* is smooth and thick. It is grey or pinkish in color. The bark of *Terminalia arjuna* peels off in sheets. The bark of *Terminalia arjuna* is very important for medicine. It has lots of things like flavonoids and tannins and triterpenoids.

Leaves:- The leaves of *Terminalia arjuna* are simple. They are oblong. They grow opposite each other. The upper part of the leaves of *Terminalia arjuna* is dark green. The lower part is pale. The leaves of *Terminalia arjuna* have a vein in the middle and smaller veins on the sides.

Flowers:- The flowers of *Terminalia arjuna* are white or yellowish. They grow in clusters. The flowers of *Terminalia arjuna* smell nice. They attract insects. This helps *Terminalia arjuna* get pollinated.

Fruits:- The fruits of *Terminalia arjuna* are special. They are shaped like an egg. The fruits of

Terminalia arjuna are fibrous and woody. They have five wings. When the fruits of *Terminalia arjuna* are mature they are brown. This helps the seeds of *Terminalia arjuna* spread in the wind.

Roots:- The roots of *Terminalia arjuna* are deep. They are well developed. They branch out a lot. This helps *Terminalia arjuna* stay anchored in the soil, near rivers. It also helps *Terminalia arjuna* get the nutrients and water it needs

Botanical Parts of *Terminalia arjuna* (*Arjuna* Plant)



Fig. 2: Botanical parts of the plant

Phytochemicals of *Terminalia arjuna*

Terminalia arjuna is an important medicinal plant widely recognized for its rich phytochemical composition and significant therapeutic potential. The bark contains various bioactive constituents such as flavonoids, tannins, triterpenoids, glycosides, and phenolic compounds, which are responsible for its pharmacological activities. Key triterpenoids, including arjunic acid, arjunolic acid, and arjungenin, play a vital role in providing cardioprotective effects by strengthening cardiac muscles and improving blood circulation. Flavonoids act as powerful antioxidants by neutralizing free radicals and reducing oxidative stress, while tannins exhibit astringent, antimicrobial, and anti-inflammatory properties. Additionally, the presence of essential minerals such as calcium and magnesium enhances its overall medicinal value. Due to this diverse phytochemical profile, *Terminalia arjuna* has been extensively used in traditional systems of medicine, particularly Ayurveda, for managing cardiovascular disorders like hypertension, hyperlipidemia, and heart failure. Recent pharmacological studies further support its

efficacy and highlight its potential for use in modern therapeutic formulations.

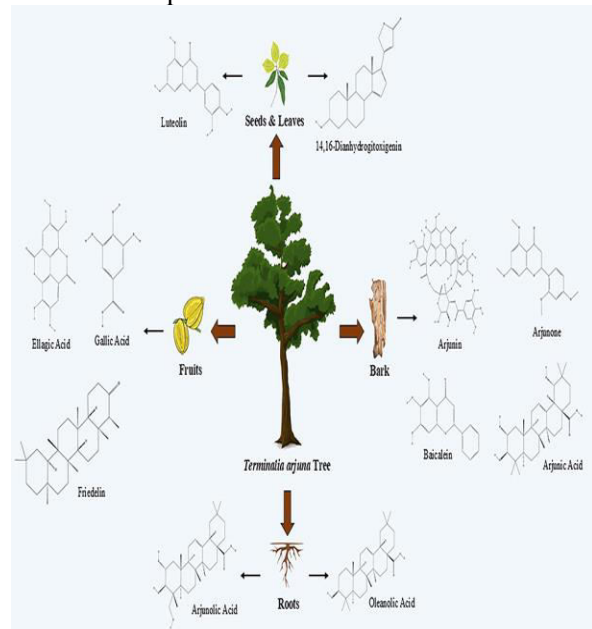


Fig. 3: Phytochemicals of *Terminalia arjuna*
Medicinal Uses of *Terminalia arjuna*

Cardiotonic/ Heart Diseases:

Terminalia arjuna is really good for the heart. It helps make the heart muscles stronger. *Terminalia arjuna* also helps the heart work better and gets blood flowing to the heart. This is very helpful for people with angina pectoris congestive heart failure and ischemic heart diseases. *Terminalia arjuna* has properties that keep the heart safe from damage.

Hypertension:

Terminalia arjuna is very important for controlling blood pressure. It helps the blood vessels work better and gets them to relax. This makes it easier for blood to flow and helps blood pressure. If you use *Terminalia arjuna* regularly it can help keep your blood pressure normal and prevent problems that come with blood pressure.

Hyperlipidemia:

Terminalia arjuna is very good at lowering the cholesterol in your blood. It reduces the cholesterol and triglycerides and increases the good cholesterol. This helps keep your blood vessels clear and lowers the risk of getting atherosclerosis and other heart problems.

Liver Disorders:

Terminalia arjuna is also good for the liver. It helps the liver work better. Keeps the liver cells

safe. *Terminalia arjuna* helps get rid of toxins and supports the liver when it needs to heal. This makes *Terminalia arjuna* very useful for people, with liver problems.

Wound Healing:

The bark of *Terminalia arjuna* helps wounds heal faster. It does this by making the body make collagen and grow new tissue. The bark also has properties that prevent infection and reduce swelling. This helps the wound heal quickly.

Blood-Clearing Property:

Terminalia arjuna helps clean the blood. It also helps blood flow properly. This is good for women's health, during their periods. *Terminalia arjuna* also helps keep the body healthy by fighting off stuff that can harm it. It keeps the body in balance. Makes a person feel good.

Marketed and Formulated Products of *Terminalia arjuna* used to make a lot of products.

Terminalia arjuna is used in products mainly for the health of the heart and blood vessels to control the amount of fat in the blood and to stop cells from getting damaged.

Arjuna Capsules/Tablets You

can buy Arjuna Capsules or Arjuna Tablets. These have the stuff from the bark of the *Terminalia arjuna* tree to help the heart. For example you can buy Himalaya Arjuna Capsules or Dabur Arjuna Tablets.

Arjuna Churna/Powder

There is also Arjuna Churna or Arjuna Powder. People use this to make a drink. They mix it with milk to help keep the heart healthy. For example you can buy Baidyanath Arjuna Churna.

Nutraceutical Supplements

Some people take *Terminalia arjuna* as a kind of food supplement. These are called Nutraceutical Supplements. They have the good stuff, from the *Terminalia arjuna* tree to help with fat in the blood or to stop cells from getting damaged. For example you can buy Organic India Arjuna Capsules or Planet Ayurveda Arjuna Extract.

***Terminalia arjuna* Bark for Cotton and Silk Fabrics**

Eco-Friendly Natural Dye from *Terminalia arjuna* Bark for Cotton and Silk Fabrics. The study checks if *Terminalia arjuna* bark can be used as a dye for cotton and silk fabrics. *Terminalia arjuna* bark makes long-lasting colors when used with

special helpers like ferrous and aluminum sulfate. These natural dyes from *Terminalia arjuna* bark are good for the environment because they are biodegradable and non-toxic. We tested methods of adding the helper to the dye. The methods included adding the helper during and after the dyeing process. These methods helped us get the color and make sure it didn't fade easily. *Terminalia arjuna* seems like an eco-friendly option for dyeing fabrics. It makes fabrics look good. Is also good for the planet. Using *Terminalia arjuna* for dyeing can help make the textile industry more sustainable and support the economy. This is a step, towards making clothes in a way that does not harm the environment.

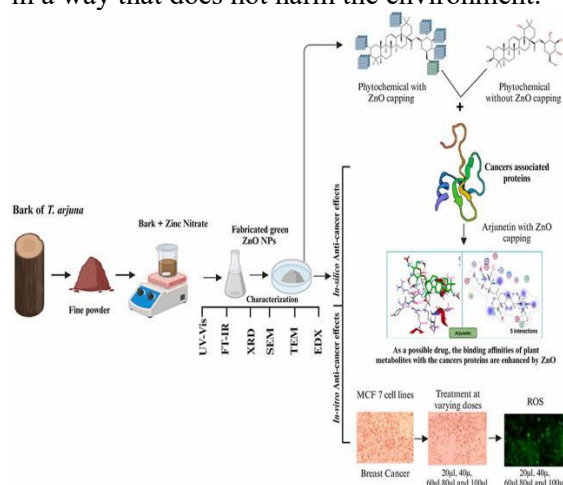


Fig. 3: Recent Advancement

Nanotechnology-Based Research on *Terminalia arjuna* (Recent Studies)

Research on *Terminalia arjuna* is really interesting especially when it comes to nanotechnology. Recently people have been studying *Terminalia arjuna*. They are using it for something called green nanotechnology. This is where they use the extract from the *Terminalia arjuna* plant as a way to make nanoparticles. The bark of the *Terminalia arjuna* tree was used to make particles of zinc oxide. The tiny particles were made using the phytochemicals from the *Terminalia arjuna* bark, which helped to make the particles and keep them stable. These tiny particles were then tested on breast cancer cells. They were found to be very effective at stopping the cancer cells from growing and eventually killing them. The scientists were able to see that the particles were the size and shape. They also found out that the

phytochemicals in the *Terminalia arjuna*, like acid and arjunetin can attach to certain proteins that are involved in cancer, such as BRCA1 and neurofibromin. When they added zinc to the particles it made them even better at fighting cancer. So these tiny particles of zinc oxide made from *Terminalia arjuna* bark are very promising, for treating breast cancer as found by Padmavathy and others in 2024.

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Therapeutic activities

Cardioprotective Activity of *Terminalia*

Terminalia arjuna bark is good for heart health. It helps people with angina by reducing the number of chest pain attacks. They can also exercise more without getting tired. They need to take conventional medications for chest pain. People who had a heart attack and are recovering have shown heart function. Their heart pumps blood efficiently. The heart muscle also gets smaller. *Terminalia arjuna* helps people with heart failure feel better. They can breathe easily. They also pass urine. Their blood pressure gets lower. People with blood pressure have better heart function. Their heart muscle gets thinner. *Terminalia arjuna* also helps people with heart disease and ischemic mitral regurgitation. Their heart function improves. They can exercise more

The bark also helps prevent blood clots and reduces cholesterol. It increases cholesterol. Terminalia arjuna is a way to support heart health. It helps with angina, heart failure, high blood pressure and high cholesterol.

Antihyperlipidemic activity

Terminalia arjuna is good, for lowering cholesterol. It has flavonoids, tannins and phytosterols that help regulate cholesterol. In animal studies Terminalia arjuna extract reduces cholesterol and triglycerides. It increases cholesterol. It works by blocking an enzyme that makes cholesterol. This reduces the amount of cholesterol made in the liver. Terminalia arjuna also prevents fat from building up in tissues. It reduces inflammation and oxidative stress. This helps improve blood vessel function. It also stabilizes plaque in blood vessels. Terminalia arjuna provides heart benefits. It has inflammatory and cholesterol-lowering effects. It may help with cholesterol, atherosclerosis and related heart disorders. It supports long-term heart health.

Anti-inflammatory Activity

Terminalia arjuna is really good at reducing inflammation. It does this by stopping the release of things that cause inflammation and reducing swelling in tissues. The special things in the Terminalia arjuna plant help with symptoms of inflammation which makes it useful for things like arthritis and other diseases that cause inflammation.

Antimicrobial Activity

Terminalia arjuna is also good at fighting off microbes like bacteria and fungi. This is why people have used it for a time to treat infections and stop microbes from growing. The Terminalia arjuna plant has things like tannins that help with this.

Wound Healing Activity

The bark of the Terminalia arjuna plant is very helpful for healing wounds. It helps the body make tissue and collagen which is important for healing. The Terminalia arjuna plant also reduces inflammation. Stops infections from happening at the wound site. This makes it useful for treating cuts, ulcers and other skin injuries. The Terminalia arjuna plant is really good, at helping the body heal itself.

Clinical Evaluation of Terminalia

A recent study by Mote D et al. (2025) Checked the safety and effectiveness of a Terminalia arjuna medicine (Vedistry Arjuna + Tablet) in people with cholesterol and stable chest pain. The study found that it greatly reduced cholesterol, triglycerides and bad cholesterol levels. It also improved heart function, including how people could exercise and how often they had chest pain. No serious side effects were seen, which shows it is well tolerated. The results show that Terminalia arjuna can help lower cholesterol and protect the heart in people, which matches studies on its benefits. In addition to heart health the study found effects on inflammation markers and blood vessel function. This suggests it has benefits for blood vessels than just lowering cholesterol. Peoples quality of life. They reported they could do more physical activities and had fewer symptoms. These findings support the use of Terminalia arjuna as a treatment in managing heart health risks and long-term metabolic support. The Terminalia arjuna formulation shows promise in helping to manage risk and supporting overall metabolic health. Terminalia arjuna may be an addition to existing treatments, for heart health.

Conclusion

Terminalia arjuna shows that our ancestors were onto something long before we had labs and research papers.

Its bioactive compounds, like flavonoids, tannins, and triterpenoids showing therapeutic promise in cardiovascular health, diabetes management, wound healing and periodontal therapy, due to its anti-inflammatory and antimicrobial properties. In a way, it quietly supports the heart, similar to that one responsible friend who reminds everyone to stay healthy but never makes a fuss about it. What's interesting is that while scientists are exploring it in modern fields like nutraceuticals and nanotechnology, it continues to do its traditional job perfectly. It seems like it didn't need an upgrade, just some recognition.

Even though more detailed studies are still needed, its benefits are pretty clear. Terminalia arjuna feels less like a "new discovery" and more like an old solution we are finally learning to understand properly—simple, reliable, and already doing its job long before we noticed it.

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Cite this article as:

Chilore S., Singune S., Goyanar G. and Pawar S. (2026). A Review on *Terminalia arjuna*: Phytochemistry and Pharmacological Potential. *Int. J. of Pharm. & Life Sci.*, 17(6):10-16.

Source of Support: Nil

Conflict of Interest: Not declared

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