Terminalia arjuna

TAXONOMIC CLASSIFICATION:[1]

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Order: Myrtales

Family: Combretaceae

Genus: *Terminalia*

Species: *arjuna*

Vernacular name: Arjuna

(https://honeyfurforher.com/arjuna-herb-uses-benefits-side-effects-arjuna-for-heart-cholesterol-blood- pressure/)

INTRODUCTION:

Terminalia arjuna is an ayurvedic plant with a significant medicinal value. It is commonly known as Arjuna, Indradru, Partha and Veeravriksha which belongs to Combretaceae family comprising of nearly 200 species distributed around the world. Nearly 24 species of *Terminalia* have been reported from various parts of India. [3] *Arjuna* tree is about 60-80 ft in height, and is seen along rivers, streams, and dry water bodies throughout the Indo-sub-Himalayan tracts. It is also found in the forests of Sri Lanka and Mauritius. It grows almost in all types of soils, but prefers humid, fertile loam and red lateritic soils. It can tolerate half submergence for a few weeks. [2]

https://www.amazon.com/Terminalia-Arjuna-Marudha-Maruthu- Growing/dp/B075BMM6RD

Major chemical constituents of Arjuna:[2]

Part of plant	Major chemical constituents	???
Stem bark	Triterpenoids	Arjunin, arjunic acid, arjunolic acid, arjungenin, terminic acid, ajunglucosides IV and V, arjunasides A-E, 2-alpha, 3-beta-dihydroxyurs-12,18-dien-28-oic acid 28-O-beta-d-glucopyranosyl ester
	Glycosides	Arjunetin, arjunoside I, arjunoside II, arjunaphthanoloside, terminoside A
	Flavonoids	Arjunolone, arjunone, baicalein, luteolin, gallic acid, ethyl gallate, quercetin, kempferol, pelargonidin, oligomeric proanthocyanidins
	Tannins	Pyrocatechols, punicallin, punicalagin, terchebulin, terflavin C, castalagin, casuariin, casuarinin
	β-sitosterol	
	Minerals/trace elements	Calcium, aluminum, magnesium, silica, zinc, copper
Roots	Triterpenoids	Arjunic acid, arjunolic acid, oleanolic acid, terminic acid
	Glycosides	Arjunoside I, arjunoside II, arjunoside III, arjunoside IV, 2α,19α-dihydroxy-3-oxo-olean-12-en 28-oic acid 28-O-β-d-glucopyranoside
	β-sitosterol	
Leaves	Flavonoids	
	Alkaloids	
	Tannins	
	Steroids	
	Phenolic compounds	
	Oxalic acid	
	Inorganic acid	
Fruits	Glycosides	
	Flavonoids	Luteolin
Seeds	Cardenolide	14,16-dianhydrogitoxigenin-3-beta-d-xylopyranosyl (1-->2)-O-beta-d-galactopyranoside

Terminalia arjuna tree bark is used in Ayurveda for the purposes of cardiovascular health. It has a large variety of bioactives. Research has proved potential of the water extract to improve left ventricle function of the heart without any observable toxicity of side effects when taken at 500mg thrice a day (every 8 hours).The water extract is effective in improving cardiac function in patients who have recently undergone cardiac trauma or injury.[4]

((https://www.ayurtimes.com/terminalia-arjuna-arjun- tree/)

PROPERTIES AND USES:[6][2][3]

- Fights damage from free radicals and inflammation
- Protects the heart
- Fights lipid disorders
- Tackles high blood pressure
- Boosts energy and exercise performance
- Bark acts as an astringent and is used in fevers and in fractures and contusions.
- Pulverised bark gives relief in symptomatic hypertension and acts as a diuretic in cirrhosis of liver.
- Juice of leaves is used in earache.

DOSAGE:

***Terminalia arjuna* Bark Powder (Arjuna Churna) Dosage**

The general dosage of ***Terminalia arjuna* Bark Powder (Arjuna Churna)** is as follows.	
Children	1 to 3 grams
Adults	3 to 6 grams
Maximum Possible Dosage	24 grams Per Day (in divided doses) **
* Twice a day	
** The maximum dosage of Arjuna Churna is a general estimate.	
Best Time to Take: 2 Hours After Food	
Adjuvant: Milk, Jaggery, or Sugar	

(https://www.ayurtimes.com/terminalia-arjuna-arjun-tree/)

As mentioned in Ayurvedic Pharmacology, 1gm to 3gm of Arjuna powder is safe for consumption[8]

SIDE EFFECTS OF EXCESS CONSUMPTION: [7]

No serious side effects have been reported against Termainalia arjuna. However, some mild side effects may include constipation and flatulence.

RESEARCH:

1. One study was conducted to determine the effect of ethanolic fraction of T. arjuna on blood lipids and atherosclerosis in rabbits fed with high fat diet (HFD). Twenty New Zealand rabbits of either sex were randomly divided into five groups: the first two were normal diet group and HFD (21% fat) group and the remaining three groups received high cholesterol diet supplemented with standard drug (Atorvastatin 10 mg kg(-1) body weight), T. arjuna ethanolic fraction (100 and 200 mg kg(-1) body weight), respectively. The concentration of total cholesterol (TC), low density lipoprotein (LDL) cholesterol, triglycerides (TGs), very low density lipoprotein (VLDL) cholesterol and high density lipoprotein (HDL) cholesterol was determined in rabbits at the start of the experiment, at the 14th, 30th days and at the end of the study. Results showed that T. arjuna significantly decreases TC, LDL and TG levels and increases HDL and lessens atherosclerotic lesion in aorta . Hence T. arjuna extract can effectively prevent the progress of atherosclerosis. This is likely due to the effect of T. arjuna on serum lipoproteins and its antioxidant and anti-inflammatory properties[9]
2. The methanolic extract of the bark powder of *Terminalia arjuna* in rat induces myocardial HSP72 and augments myocardial endogenous antioxidants, without causing any cellular injury and offers better cardioprotection against oxidative stress associated with myocardial IR injury. This study demonstrates that pretreatment with both the doses of *Terminalia arjuna* methanol extract can provide post-ischemic myocardial preservation. The induction and expression of HSP72 suggest an important role for the *Terminalia arjuna* methanol extract in myocardial cell protection after regional myocardial IR injury.[10]
3. Carbon tetrachloride (CCl_4) is a well-known hepatotoxin and exposure to this chemical can induce oxidative stress and cause liver injury by the forming free radicals. Acute and chronic renal damage are also very common pathophysiologic disturbances caused by CCl_4. This study was conducted to evaluate the protective role of the aqueous extract of the bark of *Termnalia arjuna* (TA) (50 mg/kg body weight) for one week , on CCl_4 induced oxidative stress and resultant dysfunction in the livers and kidneys of mice. The results concluded that aqueous extract of TA protects liver and kidney tissues against oxidative damages and could be used as an effective protector against CCl_4 induced hepatic and renal damages.[11]

Precaution & Warning:[5]

Pregnancy: Terminalia arjuna might be possibly unsafe during pregnancy. It is best to avoid using any terminalia species during pregnancy

Diabetes: Terminalia might lower blood sugar levels. Hence diabetes medications might need to be adjusted by the healthcare provider.

Surgery: Terminalia might decrease blood sugar levels and interfere with blood sugar control during surgery. It is always recommended to stop taking Terminalia at least 2 weeks before a scheduled surgery.

INTERACTION WITH MEDICATION:[5]

Anti diabetes drugs: Terminalia might lower blood sugar. Diabetes medications are also used to lower blood sugar. Taking Terminalia along with diabetes medications might cause Hypoglycemia. Some medications used for diabetes include glimepiride (Amaryl), glyburide (DiaBeta, Glynase PresTab, Micronase), insulin, pioglitazone (Actos), rosiglitazone (Avandia), chlorpropamide (Diabinese), glipizide (Gl ucotrol), tolbutamide (Orinase)

REFERENCES:

1. http://nbrienvis.nic.in/files/ENVIS_635346242156611560_Terminalia%20Arjuna.pdf
2. Dwivedi, Shridhar, and Deepti Chopra. "Revisiting Terminalia arjuna–an ancient cardiovascular drug." *Journal of traditional and complementary medicine* 4.4 (2014): 224-231.
3. Amalraj, Augustine, and Sreeraj Gopi. "Medicinal properties of Terminalia arjuna (Roxb.) Wight & Arn.: a review." *Journal of traditional and complementary medicine* 7.1 (2017): 65-78.
4. https://examine.com/supplements/terminalia-arjuna/
5. https://www.emedicinehealth.com/terminalia/vitamins-supplements.htm
6. https://m.dailyhunt.in/news/india/english/curejoy-epaper-curejoy/11+health+benefits+of+terminalia+arjuna+a+herb+at+the+heart+of+your+health-newsid-93583078
7. https://www.indigo-herbs.co.uk/natural-health-guide/benefits/arjuna
8. Gogte, Vishnu Mahadev. *Ayurvedic pharmacology and therapeutic uses of medicinal plants*. Dravyaganvigyan), I Edn. Mumbai: Bhartiya Vidya Bhavan, 2000.
9. Subramaniam, Saravanan, et al. "Anti-atherogenic activity of ethanolic fraction of Terminalia arjuna bark on hypercholesterolemic rabbits." *Evidence-Based Complementary and Alternative Medicine* 2011 (2011).
10. Karunakaran, Gauthaman. "Cardioprotective role of methanolic extract of bark of Terminalia arjuna against in-vitro model of myocardial ischemic-reperfusion injury." *Ancient science of life* 35.2 (2015): 79.
11. Manna, Prasenjit, Mahua Sinha, and Parames C. Sil. "Aqueous extract of Terminalia arjuna prevents carbon tetrachloride induced hepatic and renal disorders." *BMC complementary and alternative medicine* 6.1 (2006): 33.