



## A Review on -Terminalia Arjuna

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### ABSTRACT:

The conventional device of medication comprise TerminaliaArjuna is moderate tree used in various ailment to cure it is discover to verify diverse compound present in them .TerminaliaArjuna has been implemented to stability the three humors Kapha, Pitta, Vata. TerminaliaArjuna is mankind of broadly used natural medicinal plant through the Bangladesh and used in traditional system of medicine like Ayurveda, Siddha and Unani. Analytical active Constituent containing Gallic acid and Arjunolic acid, B-sitosterol, Terminic acid pyrocatechols, Calcium Magnesium Zinc copper it's been medicinal cost on Pharmacological dealers as Anticancer, Antimicrobial, Antiacne, Antidiabetic, Antianthelmintic Anticholinesterase, Antiinflammatory, Antioxidant, Antiasthmatic in addition to Wound recovery. Cardioprotective and insecticidal activities it's also relevant for the treating of most cancers, Cardiomyopathy and high blood pressure.

**Key Word:**TerminaliaArjuna, Gallic acid, Arjunolic acid, Antidiabetic, Cardiotonic, B-sitosterol, Terminic acid.

### Introduction :

Medicinal flora play an crucial position in health care and are the most important uncooked materials for both conventional and conventional medicine arrangements; nevertheless the general public pick natural drugs than conventional drugs<sup>5</sup>. Despite the fact that various restorative plants have been made sense of in the Indian standard helpful framework for therapy of a few illnesses, not very many plant items are these days used in the cutting edge clinical framework to treat the majority of the sicknesses, especially; cardiovascular sicknesses (CVD), ulcers, diabetes, hack, unnecessary sweat, asthma, growth, irritation and skin issues. Among the plants, one of the restorative plants native to India is Terminaliaarjuna (Roxb.) Wight and Arn., (T. arjuna) generally known as 'Arjuna', which has been utilized as a cardiotonic in cardiovascular breakdown, ischemic, cardiomyopathy, atherosclerosis, myocardium corruption and has been utilized for the treatment of various human illnesses like blood sicknesses, pallor, venereal and viral infection; and to proceed with phenomenal strength.<sup>1-4</sup>. Terminaliaarjuna is a local Bangladeshi tree with straightforward leaf, smooth and thick bark having a place with the family Combretaceae. Blossoms are little, standard, sessile, cup-molded, polygamous, white, rich or greenish-white and powerfully honey-scented and blooming from April to July. The inflorescences are short axillary spikes or little terminal panicles and natural products are obovoid-elliptical, dim brown to ruddy brown sinewy woody, indehiscent drupe and maturing from February to May<sup>6</sup>. Every one of the pieces of the plant have been utilized for their remedial recipient impact from antiquated times. T. arjuna assists with keeping a solid heart and reduction the impacts of pressure and tension<sup>7</sup>. It has antibacterial<sup>8</sup>antimutagenic, hypolipidemic, cell reinforcement and hypocholesterolaemic and mitigating impacts<sup>9</sup>. The point of the current review was to convey the exacting investigations of T. arjuna with its phytochemical and pharmacological characteristics.The plant realm is a treasury of likely medications and over the most recent couple of a long time there has been a dramatic development in the field of home grown medication. It is getting promote in creating and created nations attributable to its normal beginning and lesser side effects.The plant TerminaliaarjunaRoxb. Regularly known as Arjuna, a typical tree for its significant phyto constituents has a place with the family combretaceae. It has been filled in many pieces of India and utilized in Ayurvedic definitions since antiquated times. The plant parts, for example, stem bark, leaves and products of T. arjuna are utilized in native arrangement of medication for various diseases. The bark powder has been found to have cardioprotective properties, hostile to ischemic, cell reinforcement activity<sup>10</sup>, hypercholesterolemia effect<sup>11</sup>, fungicidal and antibacterial<sup>12</sup>, antimicrobial<sup>13</sup>, Anti-inflammatory, immunomodulatory and antinociceptive activity<sup>14</sup>, It is also useful to cure obesity, hypertension and hyperglycemia<sup>15</sup>. The higher cancer prevention agent capability of T. arjuna stem bark is because of the presence of higher measure of phenolic and flavonoids<sup>16</sup>. The T. arjuna based phytochemicals are thought of as one of the most outstanding heart tonic<sup>17</sup>, therefore, it tends to be involved on day to day bases as tonic for solid cardiovascular system.Leaf has been accounted for hostile to malignant growth movement<sup>18</sup>, antihyperglycemic activity,<sup>19</sup>analgesic and antiinflammatory,<sup>20</sup> antifungal and antibacterial activity.<sup>21</sup>

#### I. Classification :

Kingdom- Plantae  
Sub kingdom- Tracheobionta  
Division- Magnoliophyta  
Sub Division- Spermatophyta  
Class- Magnoliopsida  
Order- Myrtales  
Family- Combretaceae  
Genus- Terminalia  
Species- arjuna.

II. **HABITAT:** It is world well known tree popular for restorative utilized. The bark TerminaliaArjuna has been utilized in India for over 3000 years. Principally has a heart cure<sup>22</sup>, the first to involved this item heart condition in this seventh century AD research on the TerminaliaArjuna has been happening beginning around 1930. TerminaliaArjuna also Amandier Indian, Amandier Tropical<sup>23</sup>, ArgunBadamierArjunaaxjun.

III. **CHARACTER:**

TREE: It is moderate tree having thick bark.

LEAVES: TerminaliaArjuna contain simple and smooth leaf.

FRUITS: Fruits are obovoid - oblong dark brown fibrous woody indehiscent drupe.

INFLOURESENCE: TerminaliaArjuna the inflorescences are short axillaries spikes or small terminal panicles.

FLOWER: Flower is small regular, sessile cup shaped polygamous, white creamy or greenish white and robustly honey scented.

POWDER: The powder of TerminaliaArjuna containing yellowish white<sup>24</sup>.

V: Gallery



Arjuna Tree<sup>4</sup>Arjuna Leave<sup>4</sup>Arjuna Bark<sup>4</sup>



Arjuna Fruits (dried)<sup>4</sup>Terminalia arjuna in Bagh-e-Jinnah, Lahore<sup>4</sup>

#### VI.PHYTOCHEMISTRY:

The significant constituents of *T. arjuna* in stem bark, root bark, natural products, leaves and seeds are all around described (Table 1). The fundamental phytochemical examination of existing mixtures in *T. arjuna* was completed by different standard conventions as referenced by Harbone<sup>54</sup> in Table 2. As bark was viewed as the main constituent according to the restorative perspective, at first announced that the bark had 34% debris content comprising completely of unadulterated calcium carbonate. Watery concentrate of *T. arjuna* is accounted for to have 23% calcium salts and 16% tannins. Natural concentrates of *T. arjuna* bark were likewise pre-arranged utilizing the consecutive techniques with various natural solvents like hexane, benzene, chloroform, CH<sub>2</sub>Cl<sub>2</sub>, dichloromethane, ethyl acetic acid derivation, butanol, ethanol, methanol and ether, and so on, to extricate different phytochemical constituents.

Compounds	Stem/ bark	Root	Activity of compounds	References
Triterpenoids	Arjunin, arjunic acid, arjunolic acid, arjungenin, terminic acid	Arjunic acid, arjunolic acid, oleanolic acid, terminic acid	Antifungal, cardioprotective	e Zhou et al., 2011a; Dwivedi, 2007
Glycosides	Arjunetin, Arjunaphthanolside, Arjunoside I, II and Terminoside-A	Arjunoside I-IV Glucopyranoside	Cardioprotective	Dwivedi, 2007
Sitosterol	Sitosterol	Sitosterol	Antimutagenic, antiinflammatory, antitussive	Zhou et al., 2011d and Dwivedi, 2007
Flavonoids	Arjunolone, Arjunone, Bicalein, Luteolin, Gallic acid, Ethyl gallate Kempferol, Proanthocyanidins, Quercetin, Pelargonidin,		Antiallergic, antibacterial, cytotoxic, antiasthmatic, antifungal, antioxidant	Zhou et al., 2011b,c,d and Dwivedi, 2007
Tannins	Pyrocatechols, Casuarinin, Casurin, Punicallin, Punicalagin, Castalagin, Terchebulin, Terflavin C,		Astringent, wound healing and antimicrobial	Dwivedi, 2007
Trace elements	Calcium, Aluminium, Magnesium, Silica, Zinc, Copper		To fill up ion requirement	Dwivedi, 2007

Table No: 1

## VII.USE:

Antimicrobial activity :<sup>29</sup>scientifically analysis reported that water extract of TerminaliaArjuna barks shows maximum amount of antimicrobial antimicrobial activities against Proteus Vulgaris, Klebsiella aerogenes, Escherichia coli and Pseudomonas aerogenis. The presence of antibacterial activity in the bark of TerminaliaArjuna exhibiting selectively maximum activity against S. epidermidis<sup>30</sup>.

Anticancer activity: Revealing that the different sort of malignant growth to treat TerminaliaArjuna separates are accumulated. Natural concentrates of TerminaliaArjuna shows to improve expanded level of life. Arjuna separate actuating DNA harm in HepG2 cells demonstrated that TerminaliaArjuna remove prompts ROS creation in HepG2 cells and thusly causes apoptosis<sup>31</sup>.

Antifungal activity: Terminalia species found five contain of natural concentrates like (T. arjuna, T. chebula, T. bellerica, T. catappa and T. alata) were tried with plant pathogenic organisms for example A. flavus, A. alternata, A. niger, A. brassicicola, and H. tetramera. The current concentrate of five plant leaves shows restrains the plant microbes<sup>32</sup>. The bark extricates were more helpful than fungicide gainful in this antifungal test. Extreme emphatically antifungal action against C. parapsilosis, C. krusei and C. albicans was exist by a combination of arjunolic corrosive with least inhibitory focus (MIC) values in the scope of 50-200 µg/ml<sup>33</sup>.

Antidiabetic activity: The TerminaliaArjuna removes have capacity to activity on diabetic. In the deductively examination diabetic rodents model treated with TerminaliaArjuna separates showed two chemicals (glucose-6-phosphatase, fructose-1, 6-diphosphatase) much decreased in liver and kidney. They have a capacity to increment insulin discharge which can respond on suppression of the gluconeogenic key catalysts (glucokinase and phosphofruktokinase)<sup>34</sup>. TerminaliaArjuna bark separate uncovered antidiabetic movement by esteem the furthest use of glucose which can kidney glycolysis and fixing the weakened liver and by diminishing its gluconeogenic age as like as insulin. The tannin, saponin, flavonoids and other constituent's presence in the bark this activity might be because of capacity of its ingrednts, which could act important constitution in upgrading the impact of glycolytic and gluconeogenic compounds<sup>35-36</sup>. have research the prophylactic medium of arjunolic acid against streptozotocin (STZ) treat diabetes in the pancreatic tissue of Swiss albino rats. STZ administration (at a dose of 65mg/kg body wt, injected into the tail vein) causes an increase in the production of both ROS and reactive nitrogen species (RNS) in the pancreas of labortical animals. Formations of these reactive intermediates minimize the intracellular antioxidant defense, maximize the levels of lipid peroxidation, protein carbonylation, serum glucose and TNF- $\alpha$ <sup>37</sup>.

Antiacne activity: Skin arrangement made cream of TerminaliaArjuna separate containing flavonoid (FF-I to III) and tannin division (TF-I to III) have been created, which were examination antimicrobial movement against Propionibacterium acnes and Staphylococcus epidermidis. The creation of FF-III (cream containing 2% flavonoid division) has present most extreme antibacterial movement against P. acnes (zones of hindrance >17 mm) and S. epidermidis (zones of hindrance >20 mm) than other creation and which is like that of standard promoted effective natural readiness<sup>38</sup>. Natural enemy of skin break out cream is non-poisonous, safe, and viable and treat patient consistence by the utilization of home grown separates from TerminaliaArjuna would be profoundly adoptable<sup>39</sup>.

Anthelmintic activity: Bark rough methanolic concentrates of TerminaliaArjuna arrangement anthelmintic action both in vitro (eggs, hatchlings and grown-up of Haemonchus contortus) and in vivo research against blended gastrointestinal trichostrongylid nematodes of sheep<sup>40</sup>. TerminaliaArjuna bark goes about as Anthelmintic action and might be fundamentally credited to its tannin content that ties with a free protein development in the cylinders for larval sustenance and lessening supplement movement bringing about larval diminished gastrointestinal digestion by straightly hindering the oxidative phosphorylation subsequently causing larval passing<sup>41</sup>.

Wound healing activity: TerminaliaArjuna bark extricate contain hydroalcoholic, phytoconstituents was accounted for to be utilized in effective application on mending rodent dermal injuries. In rodent twisted made on back it have been treated with skin applied as straightforward salve. Results demonstrate that portion III arranged as 1% basic treatment respond total epithelialization on day 20, though division I respond total epithelialization on day 9, which vital comprises of tannins<sup>42</sup>. The capacity shows of TerminaliaArjuna to add up to epithelisation of extraction wounds and greatest elasticity of entry point wounds<sup>43</sup>.

Cardioprotective activity: TerminaliaArjuna has a capacity to utilize different helpful ways heart sickness that beginning on observational appearance kept in changed therapy of old medication<sup>44</sup>.

Cardiotonic activities: In ayurvedic medication arjunolic corrosive is utilized as a heart tonic for a really long time and it has been first distinguish from TerminaliaArjuna. The bark separates have wide part triterpenoidsaponin is an arjunolic acid<sup>45</sup>. Physico detailed carried on the trial bunny and frog heart uncovered that TerminaliaArjuna bark had cardiotonic<sup>46</sup>. It was thusly revealed that intravenous organization of the glycoside, development from the bark of TerminaliaArjuna, brought about ascent in blood pressure<sup>47</sup>. It was showed that the bark powder has a cardiotonic property and diuretic. The scientific answered to detached frog heart uncovered that the water base concentrate of the bark had chronotropic and inotropic exercises. The watery concentrate of the bark is recognized from rodent atria that came about certain inotropic movement<sup>48</sup>. Water base concentrate of the bark was

distinguish from rodent atria that was again brought about ensuing work where created inotropic activity which was appearing by propranolol and cocaine<sup>49</sup>. The new component 16, 17-Dihydroneeridenone, 3-O-β-D-glucopyranosyl-(1-6)- O-β-D-galactopyranoside is recognize from arjuna root and pertinent as a cardiotonic<sup>50</sup>.

Coronary flow: <sup>51</sup>analysis structure bark to infuse fluid concentrate into detached hare heart to greatest in coronary stream. The portion was 1024 µg/ml that causes most noteworthy expansion in coronary stream.

Hypotensive effects: The investigation of infusion of alcoholic and watery concentrate into intravertebral and intracerebro-ventricular concentrate of bark that was portion subordinate tenacious bradycardia and hypoten-sion. Albeit the alcoholic concentrate show the hypotensive impact in canines was acquire by pre-treatment with atropine. In one more manner tried in canines where intravenous prompt of watery concentrate of TerminaliaArjuna brought about portion junkie falls in blood pressure<sup>52</sup>.

Effect on aortic prostaglandins: Those hares Aortic prostaglandin E2 like action was improved that were regulated TerminaliaArjuna contrasted with the individuals who were on fake treatment. The finding of raised PGE2 like action was critical on the grounds that PGE2 is known to deliver coronary vasodilation. This may conceivably show the pharmacological premise of the expanded coronary stream following TerminaliaArjuna infusion<sup>53</sup>. This may likewise be partaking to the significant job of TerminaliaArjuna in coronary vein illness (CAD) patients.

Anti-inflammatory: To take two unrefined natural ethanolic concentrate of Daturastramonium (leaves) TerminaliaArjuna (bark) and Withaniasomnifera (root) that break down polyherbal planning have calming capacity to oppose the chemical cyclooxygenase (COX) prompting oppose of prostaglandin amalgamation vausing aggravation at the third stage. From the examination of this review, it very well may be achieved that polyherbal readiness came about critical mitigating and pain relieving activities<sup>54</sup>.

Insecticidal property: : In the stem TerminaliaArjuna disconnected from Arjunolic corrosive displays critical oppose action towards 4 th instar hatchlings of Spilarctiaobliqua. More fixation to less measure of taking care of and development of the hatchlings has been viewed as 666.9 and 617.8 ppm, individually (Bhakuni et al., 2002).

Antioxidant activity : In TerminaliaArjuna bark contain cell reinforcement movement test that showed critical cancer prevention agent exercises with the IC50 worth of 7.05 µg/ml. In light of Methanol concentrate of TerminaliaArjuna has extraordinary cancer prevention agent action and may have capacity use in medicine<sup>55</sup>.

Antiasthmatic activity: TerminaliaArjuna contain Arjunolic corrosive and alcoholic concentrate have huge pole cell adjustment action and arjunolic corrosive shows well preferable adjustment reactor over alcoholic concentrate of TA<sup>56</sup>. The antiasthmatic and antianaphylactic action might be because of the pole cell settling capacity and restraint of antigen initiated receptor and acetylcholine release<sup>56</sup>.

Gastro protective effect: TerminaliaArjuna assume significant part as a gastroprotective specialist likely on the grounds that its cytoprotective nature and free extremist searching activity<sup>57</sup>.

Decrease arsenic-induced toxicity: In presents Arjunolic corrosive assume significant part against arsenic-actuated cell oxidative uncover (Manna et al., 2007).

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## VIII. CONCLUSION:

The present dissect research which uncover its references that TerminaliaArjuna is extremely advantageous plant. The enormous number of phytochemical and pharmacological properties additionally restoratively and synthetic substances significant. The most astonishing parts of the plant were conclusion of heart infections, diabetics and malignant growth. It's accounted for parts wide reach as favor of humanity to fix sickness like antimutagenic, mitigating, antibacterial, antiviral, and wound recuperating exercises. Accordingly this exploration can audit be made for human valuable hotspot for the specialists to do orderly information on home grown and poly-natural medications from TerminaliaArjuna.

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