



## Research Article

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### Pharmacognostic Studies of the *Terminalia Arjuna* (Bark)

**Amol A\* Dambal, Durgacharan A.Bhagwat, Dr. S.S. khadabadi**

Department of Pharmacognosy and Phytochemistry, Govt. College of pharmacy, Kathora naka,  
Amravati-444604. (M.S.), India.

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#### Abstract

The Bark of *Terminalia arjuna* is considered as a Cardio protective and hypolipidemic in folklore medicine. In present investigation, the detailed pharmacognostic study of *Terminalia arjuna* Bark is carried out to lay down the standards which could be useful in future experimental studies. The study includes macroscopy, microscopy, preliminary phytochemical screening and physicochemical evaluation.

**Keywords:** *Terminalia arjuna*, Pharmacognosy, Microscopy

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#### \*Corresponding author

**Amol A Dambal**

Department of Pharmacognosy and  
Phytochemistry, Govt. College of pharmacy,  
Kathora naka, M.S., India.

E-mail: [amoldambal86@gmail.com](mailto:amoldambal86@gmail.com)

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### 1. Introduction

*Terminalia arjuna* is a large, evergreen tree, with a spreading crown and dropping branches. Its grown in most parts of India and has been used in Ayurvedic formulation since ancient times. Besides its wide range of medicinal uses, *Terminalia arjuna* is planted for shades and ornamental purposes. The powder of Arjuna is produced from the grinding and sieving of stem bark. It has following advantages like free of storage, Easy for intake for all ages of life, suitable form for Medicine can be prepared.

*Terminalia*'s active constituents include tannins, cardenolide, triterpenoid saponins (arjunic acid, arjunolic acid, arjungenin, arjun glycosides), flavonoids (arjunone, arjunolone, luteolin), gallic acid, ellagic acid, oligomeric proanthocyanidins (OPCs), phytosterols, calcium, magnesium, zinc, and copper.<sup>1,2</sup> Improvement of cardiac muscle function and subsequent improved pumping activity of the heart seems to be the primary benefit of *Terminalia*. It is thought the saponin glycosides might be responsible for the inotropic effect of *Terminalia*, while the flavonoids and OPCs provide free radical antioxidant activity and vascular strengthening.<sup>3</sup> A dose-dependent decrease in heart rate and blood pressure was noted in dogs given *Terminalia* intravenously.<sup>4</sup> Recently, two new cardenolide cardiac glycosides were isolated from the root and seed of *Terminalia*.<sup>5,6</sup> The main action of these cardenolides is to increase the force of cardiac contraction by means of a rise in both intracellular sodium and calcium. In literature

details of morphology, Phytoconstituents, medicinal properties & uses of Terminalia arjuna is very sparse therefore, in present study Pharmacognostic standards of the bark of Terminalia arjuna studied. These standards are of almost importance not only finding out genuity, but also in detection of adulterants in marketed drugs.

## 2. Materials and Methods

Terminalia arjuna was obtained from local area of amravati. The sample was authenticated for its botanical identity by Botanist (Dr. P.Y.Bhogavkar VMV College of Amravati) & voucher specimen deposited in herbarium of the institute. After collection the fresh bark of the plant was dried, soak in water for few days. Dried bark was made into powder. An exhaustive Pharmacognosy was carried out using standard methodology.

### MACROSCOPIC STUDY

Size : 7.9 - 11.5 -15.5cm in length. 3.8 - 4.5 - 5.7cm in breadth.  
 Shape : Elliptical  
 Margin : Entire  
 Venation : Parallel  
 Apex : Acute to acuminate  
 Base : Sub sessile to cuneate  
 Surface : Leathery to coriaceous  
 Texture : Firm, flexible, slightly succulent  
 Colour : Dark green adaxially, light green abaxially  
 Taste : Bitter  
 Odour : Characteristic

Table .1 Physicochemical Evaluations

Extractive value	Percentage
Ethanol	25.0%
Aqueous	20.0%
Pet ether	1.4%
Loss on drying	5.12%
Ash	< 5% w/w
Heavy Metal Lead	< 10 ppm
Acid insoluble ash	< 3% w/w
Test for pathogen	Nil

### Microscopy:

Cork consists of a few layers of tangentially running & radially elongated cells, phellogen, 2-4 celled thick, phelloderm narrow, consisting of 4-6 rows of tangentially elongated & radially arranged cells. Phloem, very broad, traversed by uniseriate medullary rays running straight & parallel, occasionally becoming slightly curved near the rosette crystals; groups of phloem fibers, lignified, thin walled, tangentially arranged, associated with idioblasts containing clusters & rosettes of calcium oxalate. Some parenchymatous cells of cortex & secondary phloem contain reddish brown pigment & some cells contain starch grains.

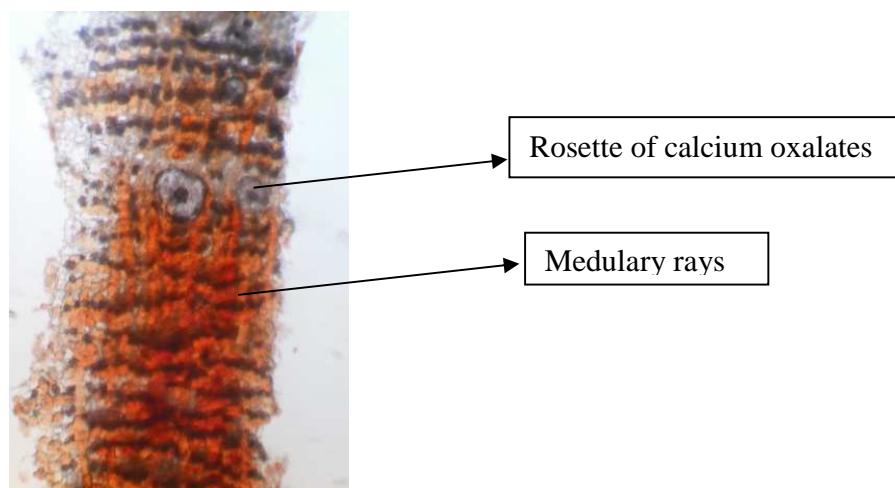


Figure 1

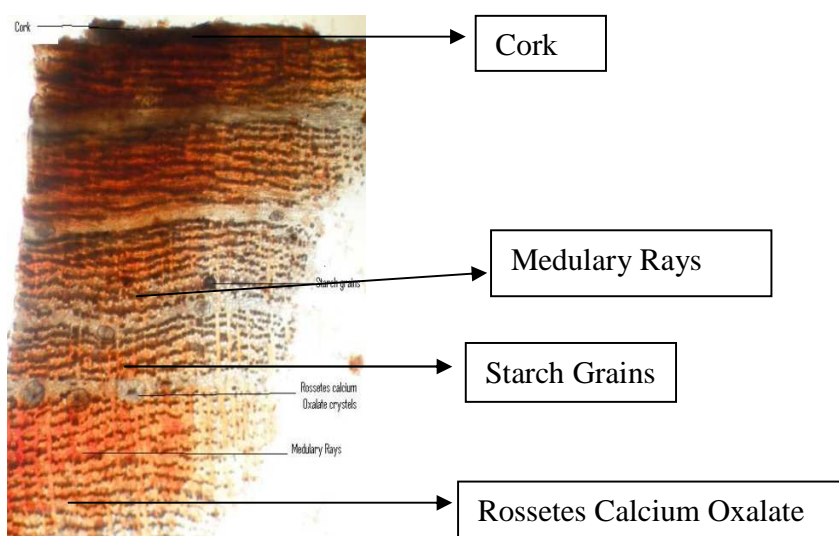


Figure 2

### Microscopy of Arjuna bark

#### Powder Microscopy:

In the powder Microscopy of Arjuna bark shows the Uniseriate Medullary rays running straight & parallel, occasionally becoming slightly curved, some cells contain starch grains.

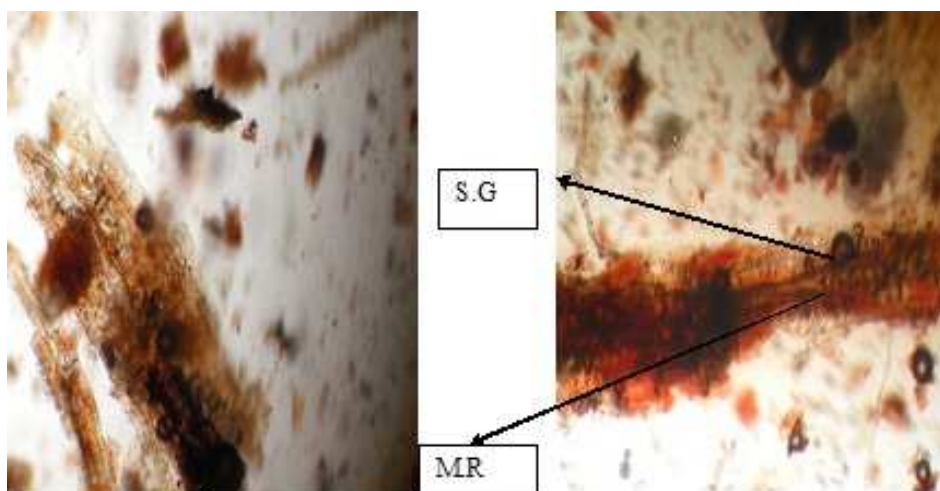


Figure 3. Medullary rays (M.R), Starch grains (S.G)

Table 2. Preliminary Phyto-Chemical Screening

Sr. no.	Chemical Tests	Ethanol extracts	Aqueous extracts
1	Alkaloids	+	+
2	Carbohydrates	+	+
3	Phytosteroids	+	-
4	Fixed oils & fats	-	-
5	Saponins	+	+
6	Phenolic compounds tannins	+	+
7	Proteins & amino acids	+	+
8	Gums & mucilages	-	-
9	Volatiles oils	-	-
10	Flavanoids	+	+

(+ = present, - = absent)

**TLC for Ethanolic Terminalia Arjuna Extracts:**

To take 10ul spot on silica gel G coated plate run in mobile phase (Toluene: ethyl acetate: formic acid.) 07:03:0.5 proportion.

**Table 3. TLC for Ethanolic Terminalia Arjuna Extracts**

Sr No.	Mobile phase	Spots	Rf values
1	Toluene: ethyl acetate: formic acid. (07 : 03 : 0.5 )	1	0.81
		2	0.10
		3	0.20
		4	0.39

**3. Results and Discussion**

The pharmacognostic study for the Bark of *T.arjuna* are laid down for the first time in this study. Morphological , Microscopical ,Powder Microscopical study need to identify the crude drug species. The result obtained from physiochemical evaluation , phytochemical screening ,TLC screening will be important to find out the genuine of the drug.In this physiochemical screening Ash Values, extractive values are useful to identify the adulteration in the drug. This above test result is important to identification for the crude drug also use for home remedy as a medicine.

**4. Conclusion**

Above study result like Morphological, Microscopical, Powder Microscopical, physiochemical evaluation, phytochemical screening, TLC screening showing the Authentification of T.Arjuna Bark species.

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