ABSTRACT

Terminalia arjuna (T. A) is one of the most common species of the genus Terminalia which has received scientific awareness for its general ethnomedicinal applications. This plant has a great involvement in curing many diseases and is used as a medicinal plant. Recent findings support its use against cardioprotective effect, lipid lowering activities, anti-diabetic activity, anti-carcinogenic, gastric activity and wound healing. The present study focusses on scientific classification of T. arjuna, nutritional composition of its bark, phytochemical compounds, therapeutic action and ethnopharmacological uses.

Keywords: Terminalia arjuna, ethnomedicinal, cardioprotective effect, anti-carcinogenic activity.

INTRODUCTION

The common name Terminalia comes from Latin word ‘terminus’ or ‘terminalis’. This evergreen tree is very famous in all over India. According to Ayurvedic literature Terminalia arjuna is a very famous and well-known as the given name of Arjuna, Kakubha, Dhavala, Nadisarja, Partha, and Indradu (1). Terminalia arjuna 60-80 feet tall tree has grey colour bark with quadrilateral and short pointed leaves at the end with 2.3 - 3.5 cm elongated fruits which started visible in the winter (2). It is cultivated on alluvial loam and sandy well sapped soil and collected mainly from hilly regions and other parts of Indo-sub Himalayan tracts of Uttar Pradesh, South Bihar, Orissa, West Bengal, Punjab (3-6).

SCIENTIFIC CLASSIFICATION

Kingdom : Plantae

ROLE OF TERMINALIA ARJUNA BARK IN MEDICINE - A REVIEW

Ambika chauhan and Intelli
**PLANT PART USED**

*Terminalia arjuna* plant (bark, leaves and fruits) are used as medicinal purpose and still used by village people to control different ailments. The dried powder of its bark scientifically proved effective to cure malignant cells, diabetes, cirrhosis of liver and cardiac disorder, its fruit part act as stimulant and deobstruent, leaves juice for earache (7,8).

**NUTRITION**

The proximate nutritional composition of *Terminalia arjuna* bark in mg / 100 gm dry weight (Table 1) (9).

**TABLE 1.** The proximate nutritional composition of *Terminalia arjuna* bark:

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>292.78 kcal</td>
</tr>
<tr>
<td>Protein</td>
<td>2.81 gm</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>66.07 gm</td>
</tr>
<tr>
<td>Fat</td>
<td>1.91 gm</td>
</tr>
<tr>
<td>Fibre</td>
<td>9.79 gm</td>
</tr>
<tr>
<td>Ash</td>
<td>19.40 gm</td>
</tr>
<tr>
<td>β-carotene</td>
<td>610 mg</td>
</tr>
<tr>
<td>Calcium</td>
<td>42.73 mg</td>
</tr>
<tr>
<td>Chromium</td>
<td>1.44 mg</td>
</tr>
<tr>
<td>Copper</td>
<td>1.29 mg</td>
</tr>
<tr>
<td>Iron</td>
<td>1.82 mg</td>
</tr>
<tr>
<td>Zinc</td>
<td>1.20 mg</td>
</tr>
</tbody>
</table>
**PHYTOCHEMICAL COMPOUNDS**

<table>
<thead>
<tr>
<th>Compound</th>
<th>Part of Plant</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arjunic acid</td>
<td>Stem bark</td>
<td>(10)</td>
</tr>
<tr>
<td>Terminoic acid</td>
<td>Stem bark</td>
<td>(11)</td>
</tr>
<tr>
<td>Arjunolitin</td>
<td>Stem bark</td>
<td>(12)</td>
</tr>
<tr>
<td>Arjunoic acid</td>
<td>Stem bark</td>
<td>(13)</td>
</tr>
<tr>
<td>Tannin (containing gallocatectin, epicatechin, catechin, epigallocatechin)</td>
<td>Stem bark</td>
<td>(14)</td>
</tr>
<tr>
<td>Terminoside A</td>
<td>Stem bark</td>
<td>(15)</td>
</tr>
<tr>
<td>Casuarianin</td>
<td>Stem bark</td>
<td>(16)</td>
</tr>
<tr>
<td>Arjunone, Cerasidin Ellagic acid, Arachidic stearate, Arjunic acid, Oleanolate, Friedelin, Gallic acid, Methyl oleanolate, Terminolitin</td>
<td>Fruit</td>
<td>(17)</td>
</tr>
<tr>
<td>14-16-dianhydrogitoxigenin 3-β-D-xylophranosyl-O-β-D-galactopyranoside</td>
<td>Seed</td>
<td>(19)</td>
</tr>
</tbody>
</table>

*Terminalia arjuna* is very admired medicinal plant and used as herb to heal multiple diseases. The comprehensive pharmacological actions of *Terminalia arjuna* are given below:
Dwivedi et al. (1989) reported significant decrease in mean anginal frequency systolic blood pressure, plasma cortisol and serum cholesterol. Another study by Dwivedi and Agarwal (1994) revealed that *Terminalia arjuna* brings about a considerable reduction (p<0.05) in anginal episodes, blood pressure and significant increase in both time to onset of angina and the time to appearance of ECGST-T change (p<0.001). Bharani et al. (1995) observed significant reduction in blood pressure and enhance the ejection fraction in patients with severe refractory heart failure. Dwivedi and Jauhari (1997) observed significant reduction of symptoms of angina, left ventricular ejection fraction and left ventricular mass and improved cardiomyopathy. Bharani et al. (2002) observed perfection in clinical and treadmill exercise parameters and act as cardioprotective effect in patients consuming *Terminalia arjuna* bark extract (500mg/day). Sharma et al. (2005) reported enhancement in stroke-Adams attacks and acute chest pain and brings a significant improvement in ischemic heart disease associated with rhythm disturbances and help to modify various coronary risk factors like obesity, hypertension and hyperglycemia. Dwivedi et al. (2005) observed significant reduction in ischemic mitral regurgitation and reduction in anginal frequency.

**LIPID LOWERING ACTIVITY**

Arora et al. (1995) observed reduction in systolic and diastolic blood pressure, pulse rate, serum cholesterol, high density lipoprotein and low density lipoprotein. Gupta et al. (2001) observed reduction in the level of total cholesterol and low density lipoprotein cholesterol. Chander et al. (2004) observed significant lipid lowering effect in the plasma levels of total cholesterol (Tc), triglyceride (Tg) and phospholipids (PL). Dwivedi and Gupta (2002) reported considerable decrease in total cholesterol and triglycerides and increase in HDL-cholesterol. Karpagam et al. (2011) reported significant decrease in the cholesterol by 12 per cent, Low density lipoprotein-20 per cent, (LDL), Very low density lipoprotein- 6.1 per cent (VLDL), Triglyceride levels -24 per cent (TGL). Kumar et al. (2012) reported significant lessening in total cholesterol, LDL, triglycerides, serum C - reactive protein (CRP), blood glucose and raised HDL level.
ANTI-DIABETIC ACTIVITY

Ragavan and Krishna (2006) observed significant decrease of blood glucose and reduction in the activities of glucose-6-phosphatase, fructose-1,6-diphosphatase, aldolase and an increase in the activity of phosphoglucoisomerase and hexokinase in tissues of rats. Morshed et al. (2011) reported significant enhancement in oral glucose tolerance and decrease in serum total cholesterol and triglycerides.

ANTI-CARCINOGENIC ACTIVITY

Sivalokanathan et al. (2005) observed reduction in the plasma and liver glycolytic enzymes such as hexokinase, phosphoglucoisomerase, aldolase. Verma and Vinayak (2009) reported significant elevation in the activities of catalase, superoxide dismutase and glutathione S transferase by inhibiting the activity of lactate dehydrogenase, indicated the antioxidant action and which plays a vital role in the anti-carcinogenic activity. Dhanarasu et al. (2010) reported significant decrease in DMBA-induced hamster buccal pouch carcinomas, decreased lipid peroxidation and improved levels of antioxidants.

GASTRIC ACTIVITY

Devi et al. (2007) observed a significant increase in enzymic antioxidants, protein bound carbohydrate complexes, decrease in volume of gastric juice, pepsin concentration and thus, confirmed the gastro protective activity. Devi et al. (2008) found it to be valuable in protecting the mucosal defensive factors, played anti secretory role and acts as anti-ulcer effect.

WOUND HEALING ACTIVITY

Mukherjee et al. (2003) found it to be advantageous in terms of wound contracting ability, epithelization period, tensile strength and regeneration of tissue at the wound area and thus, act as a wound healing agent. Chaudhari and Mengi (2006) reported it to be effective to increase the tensile strength of incision and excision wounds, the fastest rate of epithelialization was consisting mainly tannins by drawing the tissues closer together.

CONCLUSION This paper has tried to emphasize nutritional and medicinal value of Terminalia arjuna bark. Recent findings and present literature provides essential information about the benefits of T. Arjuna bark which can be valuable in generating awareness among people to control various diseases and to improve their health and nutritional status in a better way.

