

Review on Terminalia Catappa and it's Pharmacological Activity

Vaijayanti S.Gholap^{1*}, Sagar E. Tambe¹, Tejaswini H.Gholap², Vinayak D. Jadhav³, Vishal D. Kad⁴, Harshala T. Gholap⁵, Neha N. Dalavi⁶

Students, Samarth Institute of Pharmacy, Belhe, Maharashtra., India

Department of Pharmacology, Samarth Institute of Pharmacy Belhe, Maharashtra., India

Department of Pharmaceutics, Samarth Institute of Pharmacy, Belhe, Maharashtra., India

gholapvaijayanti5058@gmail.com

Abstract: In this review article we are focusing on Terminalia catappa Terminalia as commonly known as Country almond, Indian almond, Malabar almond, sea almond, tropical almond, beach almond and False kamani also known as Badam used as medicinal plant. The Ayurvedic plant Terminalia Catappa belongs to family Combretaceae. It shows medicinal therapeutic properties such as Antimicrobial, Anthelmintic, Antibacterial, Anti- tumor, Antidiabetics, Haematological Activity. In this review we are generally discussed about the pharmacological activity reported by using Various in-vitro and in vivo models.

Keywords: Terminalia Catappa, Almond, Pharmacological Activity.

I. INTRODUCTION

Medicinal Shops in order to assess the significance of developing natural, sustainable, and affordable medicines and cosmetics(Ake Assi. 1991). The rubric TerminaliaL. Is imperishable shrubs or trees of the Combretaceae, and nearly species are linked(Mabberley. 2008). The rubric is distributed in tropical and sub tropical regions, a many species are set up in Africa, Pakistan, India, Sri Lanka and numerous other south Asian countries(Smith.1971).



Tropical almond(Terminalia catappaL.) is a large tropical tree growing up to 35 m with an upright, symmetrically crown and vertical branches. The tree has light fruit and the nut within the fruit is comestible when completely ripe, delicious nearly like an almond but underutilized by mortal still fruits are eaten by catcalls and batons Kirtikr. 1998). In the phytochemical and physiochemical analysis of Seed contains 51.2 fixed oil painting, Catappa oil painting with 54 olein, palmitin, 23.78 crude protein, 4.27 ash, 4.94 crude fiber, 51.80 fat, carbohydrate and 548.78 Kcal spicy value and Classified in the oleic- linoleic acid group, oil painting contains high situations of unsaturated adipose acids, especially oleic (up to 31.48) and linoleic (up to 28.93) and the dinghy contains tannin(Matos. 2009). All corridor of the factory contains secondary metabolites that are used in traditional drug similar as in the operation of cancer, rheumatism, diarrhoea, dysentery, gonorrhoea, stomach cramps and sexual dysfunction, diaphoretic, anti-diabetic, anti-indigestion, anti-dysentery (Muhammad and Mudi. 2011; Akharaiyetal. 2011), skin conditions, arthritis, headache, bellyache and itching (Nadkarni. 1976). Indeed though it has been used in traditional drug for wide range of affections and for nutritive value, it isn't grown on a colony scale in Sri Lanka.

Scientific Classification

Kingdom	Plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Eudicots
Clade	Rosids
Order	Myrtales
Family	Combretaceae
Genus	Terminalia
Species	T. catappa

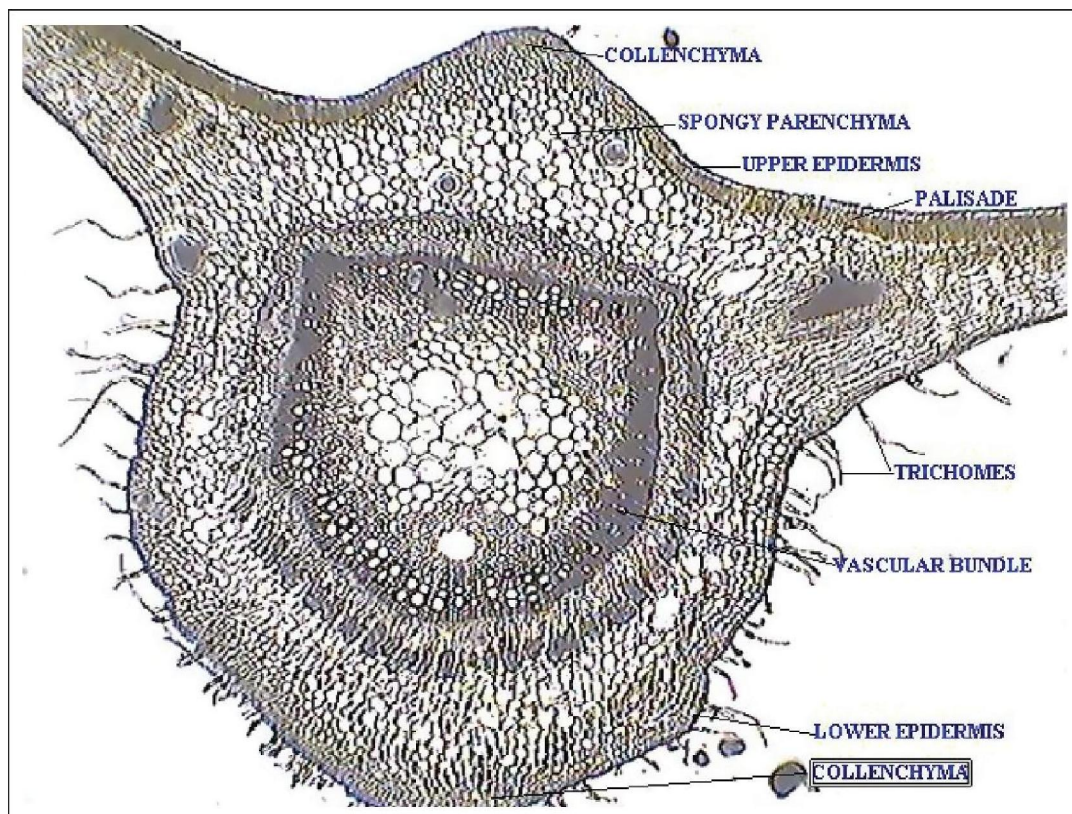
II. DESCRIPTION

Macroscopic Characters :-

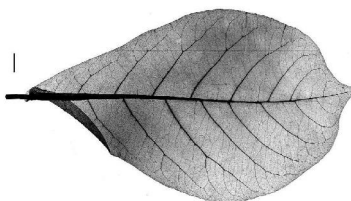
The almond tree have the spreading fibrous Near surface lateral root system and although the species Is normally deep rooted in sand. The tree provides a red, good- quality, elastic,cross-grained Timber that seasons well and works fluently. Viscosity of the wood Is 450- 720 kg/ m³ at 12 host.

Microscopic Characters

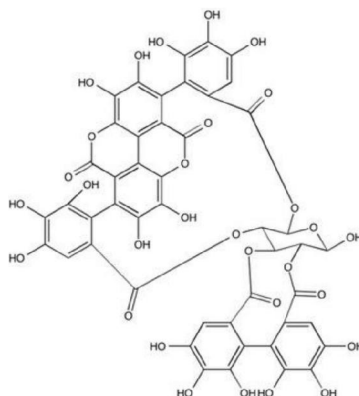
The anatomical properties showed that pores were solitary and diffuse ; axial parenchyma cells we re predominantly paratracheal, aliform and confluent.



Chemical Constituents



The phytochemicals of this factory include tannins(punicalagin, punicalin, terflavins A and B, tergallagin, tercatin, chebulagic acid, geranin, granatin B, corilagin), flavanoids(isovitexin, vitexin, isoorientin, rutin) and triterpinoids(ursolic acid, 2a, 3a, 23- trihydroxyurs-12-en-28-oic acid). 6 Hydrolysable ellagitannins and other tannin related composites have been insulated from the leaves and the dinghy of T. catappa.



Punicalagin

Pharmacological Activity

Antimicrobial Activity

Terminalia catappa excerpts were set up to contain some secondary metabolites. In This work, all the fragments attained indicate Presence of resins. Ethanol excerpt, petroleum Ether, chloroform and ethyl acetate responded appreciatively to a test on the presence of steroids. Shahinaetal. Had reported the antibacterial exertion of Oparaetal. Had reported antibacterial exertion of waterless and ethanolic excerpts of T. Catappa leaves against S. Typhi, E. coli, S. aureus and P. Aeruginosa. The antimicrobial assay of n- hexane, chloroform and ethyl acetate fragments indicated a positive exertion against the bacterial isolates tested.

Antifungal activity

The methylene chloride and methanol excerpts of T. catappa Showed antifungal exertion against Pythiummultimum, Rhizoctoniasolani, Sclerotiumrolfsii, Aspergillusfumigatus and Phytophthoraparasitica. The exertion is compared With a standard antibiotic Clotrimazole. The excerpts displayed Growth inhibitory exertion in a cure-dependent manner dependent manner.

Anthelmintic activity

Crude Excerpt of T. Catappa leaves was estimated for Anthelmintic exertion against Trichostrongyluscolubriformis, Cooperiacurticei and Haemonchuscontortus and it was Suggested that T. Catappa leaves could serve as a implicit Anthelmintic agent. The observation that SC- CO₂ excerpts of T. Catappa leaves didn't induce mutagenicity at the Boluses tested while flaunting potent Antimutagenicity and were further cytotoxic to mortal hepatoma cells than to normal liver cells is Of merit and clearances farther disquisition.

Antidiabetic Activity

The antidiabetic effect of the petroleum ether, methanol, and Waterless excerpts of the fresh, callow, green fruits of T. catappa Were determined in alloxan- convinced diabetic rats. Excerpts Produced a cure-dependent fall in blood sugar situations by 25 – 62 With the maximum effect seen after 15 days of treatment. In view of Suggested anti diabetic eventuality, effect of waterless And cold excerpts of Terminalia catappa Linn(Combretaceae) leaves, on dieting blood

sugar situations and serum biochemical analysis in alloxan-induced diabetic rats was derived. All the extracts of Terminalia catappa produced a significant anti-diabetic effect at cure situations of 1/5th of their murderous boluses.

Antioxidant Activity

The concurrent pretreatment of the Chinese hamster ovary- K1 (CHO- K1) cells with the waterless extract of T. Catappa splint vastly suppressed mitomycin C- induced micronuclei. It also inhibited lipid peroxidation (LPO) and hydrogen peroxide formation induced by TPA in mortal mononuclear leukocytes in a dose-dependent manner. The HPLC analysis of the extracts indicated the presence of Ellagic acid. The isolated ellagic acid showed strong antioxidant effect in the assay systems used.

Anti tumor Activity

T. catappa water extract suppressed the growth of H- ras converted NIH3T3 cells in a dose-dependent manner. Punicalagin also inhibited the growth of H- ras- converted NIH3T3 cells in a dose-dependent manner. Methanolic extract of T.catappa leaves produced a dose dependent cytotoxic effect in EAC cells.

Antiviral activity

The punicalin and punicalagin inhibited HIV replication in infected H9 lymphocytes with little cytotoxicity, and inhibited purified HIV reverse transcriptase with ID50 values of 8 and 5 µM, independently. The chebulagic acid and punicalin blocked the binding of recombinant HIV gp120 (gp120) to its normal cellular receptor, CD4. The fruit of T. catappa contains ellagic- acid which has anti-HIV effect.

Antiparasitic activity

A variety of studies of this result were used to determine performing conditioning against tilapia pathogens. The results indicated that Trichodina, fish ectoparasites, were canceled at 800 ppm.

Wound healing Property

A crack is the loss or breaking of cellular and functional capability of the living skins. Resistance to medicines and toxins of medicines delayed the advancement of synthetic antimicrobial agents to treat injuries. Several studies with effective pharmacological conditioning may offer healthier indispensable treatments for injuries. Khan et al. (12) suggested that the operation of T. catappa ointment on the crack shows 97% reduction in the crack area when compared with control (81%) and betadine ointment as the standard medicine. T. catappa ointment induces the epithelization briskly and this suggests that the extracts promote considerable crack- mending effect.

Therapeutic potential of Terminalia catappa

Therapeutic Use	Parts Used
Antioxidant	Leaves
Anti inflammatory	Leaves
Anti Diabetic	Fruits
Aphrodisiac	Seeds

Medicinal uses of Terminalia catappa from various countries

Country	Parts used	Medicinal use
China	Leaves	Sudorific
Indonesia	Bark and fruits	Dressing of rheumatic joints, Dermatitis
Malaysia	Leaves, Bark	Antipyretic
Mexico	Green leaves	Stop bleeding during tooth extraction
Nigeria	Leaves	Tonsillitis

Toxicology

Toxicology Azruletal. detected the primary bane (by murderous circumstance) and secondary bane (by nutritional behavior and physiological observation) of crude extract T.catappa (0.5 g/ kg, 1.0 g/ kg, and 3.0 g/ kg) during 14 days of treatment period.

III. CONCLUSION

The present literature review delineated over on the phytopharmacological value of Terminalia catappa. It's observed that this ancient tree is economically, medicinally and environmentally important, beside colorful corridor of this tree

are amended with bioactive notes. Wide diapason of natural exertion is reported from colorful corridor of this factory. Hence, similar collection of information regarding the medicinal goods and pharmacological exertion of this factory will be useful to the exploration community, who are looking for the development of natural, safe and factory- rested source of drug for colorful mortal conditions. Further in- depth studies can contribute in developing scientifically validated herbal drug from this implicit factory source.

REFERENCES

- [1]. Mudi S., Muhammad A.,(2011). Phytochemical Screening and Antimicrobial Activities of Terminalia catappa, Leaf Extracts. *Biokemistri* 2011; 23 (1).: 35 – 39.
- [2]. Shahina N, Ahmad S, AjazRasool S, Siddiqi R, Sayeed SA. In vitro antibacterial activity of the extracts derived from Terminalia catappa. *Res J Microbiol*, 2007; 23: 180-184.
- [3]. Goun E, Cunningham G, Chu D, Nguyen C, Miles D. Antibacterial and antifungal activity of Indonesian Ethnomedical plants. *Fitoterapia* 2003; 76: 592-596.
- [4]. Parimala Gandhi P, Venkatalakshmi P, Brindha P. Efficacy Of Terminalia catappa L. wood and bark against some Fungal species. *Int J Cur Microbiol App Sci* 2015; 4(9):74-80.
- [5]. Nurulaini R, Azrul LM, Effendy AWM, Imelda LV. Determination of anthelmintic potential in Terminalia Catappa by modified selected in vitro bioassay. 2nd International Conference on Biotechnology and Food Science IPCBEE, IACSIT Press, Singapore 2011. P. 7.
- [6]. Chiou Y., Bin-Lin S., Ming-Weng Y., Fu Ko T. Antimutagenicity of Supercritical CO₂ Extracts of Terminalia catappa Leaves and Cytotoxicity of the Extracts to Human Hepatoma Cells. *J. Agric. Food Chem.* 2003.;51: 3564-3567
- [7]. Morioka T, Suzui M, Nabandith V, Inamine M, Aniya Y, Nakayama T, Ichiba T, Yoshimi N. Modifying effects of Terminalia catappa on azoxymethane-induced colon Carcinogenesis in male F344 rats. *Eur J Cancer Prev* 2005;14: 101-105.
- [8]. Ahmed S., Swamy V., Dhanapal P., Chandrashekara V. Anti-Diabetic Activity of Terminalia catappa Linn. Leaf Extracts in Alloxan-Induced Diabetic Rats. *IJPT* 2005; 4:36-39, 2005.
- [9]. Liu TYL, Ho LK, Tsai YC, Chiang SH, Chao TW, Li JH, Chi CW. Modification of mitomycin C-induced clastogenicity by Terminalia Catappa L. in vitro and in vivo. *Cancer Lett* 1996; 105: 113-118.
- [10]. Toshiya M, Sigetomo Y, Yasuo O, Yoshio T, Tomochika T, Tadao A, Ayumi S, Mami N. Evaluation of the antioxidant Activity of environmental plants: Activity of the leaf Extracts from seashore plants. *J Agric Food Chem* 1999; 47:1749 -1754.
- [11]. Chen PS, Li JH. Chemopreventive effect of punicalagin, a Novel tannin component isolated from Terminalia catappa, On H-ras-transformed NIH3T3 cells. *Toxicol Lett* 2006; 163: 44-53.
- [12]. Saroja M, Annapoorani S. Antitumor activity of methanolic Extract of Terminalia catappa leaves against Ehrlich Ascites Induced carcinoma in mice. *Int Res J Pharm* 2011; 2(12): 253-254.
- [13]. Nagappa AN, Thakurdesai PA, Venkat Rao N, Singh J. Antidiabetic activity of Terminalia catappa Linn fruits. *J Ethnopharmacol* 2003; 88: 45-50.
- [14]. Chitmanat C, Tongdonmuan K, Khanom P, PachontisP, Nunsong W. ISHS Acta Horticulturae: WOCMAP Congress On medicinal and aromatic plants, Vol. 4, Targeted Screening of medicinal and aromatic plants economics and Law 2005. P. 678.
- [15]. Azrul LM, Adzemi MA, Ahmad WM, Effendy AW. Determination of toxicological effects of Terminalia catappa leaves on Sprague-Dawley white rats in short-term period. *Int J Toxicol Appl Pharm* 2013;3:44-7.