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Traditional Uses of *Terminalia catappa* and its Validation by Phytochemical Screening

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Abstract: Traditional medicine plays a vital role in social health as its knowledge is imparted generation to generation and because of its authenticity, easy availability and low cost, is used widely. In turn, conservation of plants of medicinal value is done by the society giving the plants cultural value. *Terminalia catappa*, one of the plants used for variety of ailments in traditional medicine. In present study, the traditional uses of *T. catappa* were enumerated by the survey and discussion with people especially old age ones having knowledge of traditional medicine; also from the literature survey carried out. Along with, the qualitative phytochemical screening of bark, leaves and fruits was done to get array of bioactive secondary metabolites in different solvents like methanol, ethanol and distilled water. The qualitative phytochemical screening shows the presence of tannins, phenols, cardiac glycosides, flavonoids, alkaloids, coumarines, steroids, resins, carbohydrates and proteins. Extractive values were also quantified to get the percentage of bioactive components in plant samples. The highest extractive value found in aqueous leaf extract (26.664%) and lowest in aqueous bark extracts (21.884%).

Keywords: Traditional medicine, *Terminalia catappa*, Phytochemical screening, Extractive value, bioactive components, secondary metabolites.

I. INTRODUCTION

Traditional medicine plays a vital role in social health as its knowledge is imparted generation to generation and because of its authenticity, easy availability and low cost, is used widely. According to WHO (World Health Organization), about 40 million people believe and use traditional plant based medicine to get rid of diseases (Rai *et. al.*, 2000)[1]. The traditional medicine is generally having no or very little side effects, hence found more reliable. In turn, conservation of plants of medicinal value is done by the society giving the plants cultural value. A medicinal plant is defined as any plant which has compounds that can be used for the therapeutic purpose or which contain precursors of chemo-pharmaceutical synthesis (Jain *et. al.*, 2019)[2]. Phytochemicals (from the Greek word phyto, meaning plant) are biologically active, naturally occurring chemical compounds found in plants, which provide health benefits for humans further than those attributed to macronutrients and micronutrients (Hasler and Blumberg, 1999)[3]. They protect plants from disease and damage and contribute to the plant's color, aroma and flavor (Saxena *et. al.*, 2013)[4].

T. catappa is one of the most common plants used in Ayurveda; hence, it is considered as “King of Medicine.” According to Ayurveda and Siddha, *T. catappa* is useful in the treatment of inflammation diseases, wound healing, allergies, skin related problems, asthma, ulcer, cardiovascular diseases, diarrhea, etc. It is also said to be helpful to restoring the power of senses (Chole and Ravi, 2020)[5]. *Terminalia catappa*, one of the plants used for variety of ailments in traditional medicine (Table 1.)

Table I: Traditional uses of *Terminalia catappa*

Plant part	Traditional use	Reference
Bark	Diuretic	Parrotta, 2001[6]; Untwal and Kondawar, 2006[7].
	Cardiotonic	
	Antipyretic	
	Rheumatism	
	Dermatitis	
Leaves	Dressing of rheumatism	Untwal and Kondawar, 2006[7]; Kirtikar and Basu, 1991[8]; Mortan, 1985[9]; Kasahara and Hemmi, 1995[10]; Lin, 1992[11]; Aimola <i>et al.</i> , 2014[12].
	Liver Diseases	
	Scabies and Leprosy	
	Dermatitis	
	Diuretic	
	Tonsillitis	

	Eye problems	
Fruits	Leprocy	Untwal and Kondawar, 2006[7]; Kirtikar and Basu, 1991[8]; Kasahara and Hemmi, 1995[10]; Lin, 1992[11]; Annegowda <i>et al.</i> , 2010[13]; Ratnasooriya and Dharmasiri, 2000[14].
	Headeache	
	Dressing of rheumatism	
	Dermatitis	
	Antipyretic	
	Asthma	
	Cough	
	Diarrhea	

A. Botanical Description

It is a medium sized tree, with upright and horizontal branches. Its branches are characteristically arranged in the symmetrical crown tier. The leaves are large, broad, and ovoid shaped. Leaves are dark green colored. Flowers are bisexual, whitish yellow in colour and born on spike inflorescence. The fruit is drupe, ovoid-shaped with a single seed. The fruit is green in color when raw, but when ripens, turns into reddish yellow color. The seed is edible when fruit ripens.

II. MATERIAL AND METHODS

A. Collection And Processing Of Mature Samples Of Plant

The mature samples were collected from different sites of forest area of district Chandrapur of Maharashtra state in India. The material was identified at Botany Department, Institute of Science, Nagpur and the specimen was deposited. The samples of selected plant species of different parts such as bark, leaves, and fruits were collected at their mature stage of development. The samples were carefully examined and insect damaged, fungus-infested samples were removed. Only healthy samples selected were washed with water and then soaked with filter paper. Then the samples were spread out and shade dried at room temperature for about 10 to 20 days up to complete drying until they broke easily by hand. The samples were powdered using mortar and pestle and electrical grinder.

B. Method of Extraction

Bark, leaf and fruit powder used to extract with different solvents like distilled water, ethanol and methanol with the help of Soxhlet extraction method. A known mass of sample was used against a known volume of solvent. After complete extraction, the extractive value was calculated for each extract as per standard procedure (Khandelwal, 2002)[15].

Extractive value (%) = (Weight of dried extract / Weight of plant material) X 100

The extracts were stored in refrigerator for further use.

C. Phytochemical Analysis

Phytochemical screening was performed to identify phytochemicals in the Aqueous, Methanolic and Ethanolic extracts of plant parts used in the study in this present work by the standard methods [16, 17, 18].

III. RESULT AND DISCUSSION

A. Qualitative Phytochemical Analysis

The qualitative phytochemical analysis gives the array of various primary and secondary metabolites present and shown the presence of tannins, phenols, cardiac glycosides, flavonoids, alkaloids, coumarines, steroids, resins, carbohydrates and proteins etc. in varying level in different solvents used (Table 2).

B. Extractive Values

The extract of leaves, bark, and fruits were prepared using three solvent i.e., distilled water, methanol and ethanol and the total extractive value calculated. The highest extractive value found in aqueous leaf extract (26.664%) and lowest in aqueous bark extracts (21.884 %) (Table 3, Figure 1). An extractive value gives the total possible biologically active percent of extract present in the sample [19], which get varied with the solvent.

IV. CONCLUSION

This study has shown that bark, leaves and fruits of *Terminalia catappa* are the source of essential primary and secondary metabolites with significant percentage of extractive value. Thus the phytochemical screening of *Terminalia catappa* will be helpful

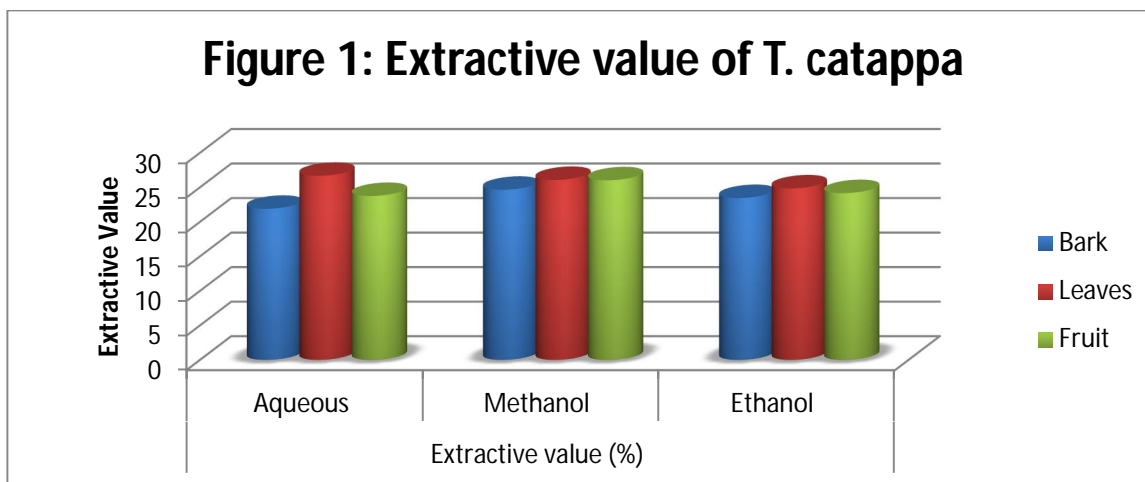
for further research formulation of therapeutics and drug development, as it has been used in traditional healer’s medicine since ancient times by tribal and local people.

Table II: Qualitative Phytochemical tests: *Terminalia catappa*

T. catappa Tests	Bark			Leaves			Fruits		
	Aq. Ex.	Meth. Ex.	Eth. Ex.	Aq. Ex.	Meth. Ex.	Eth. Ex.	Aq. Ex.	Meth. Ex.	Eth. Ex.
Tannins	+++	+++	+++	++	++	++	++	+++	+++
Saponins	+++	+++	+++	+++	+++	+++	+++	+++	+++
Flavonoids	++	++	++	++	++	++	++	++	++
Terpenoids	--	--	--	--	--	--	+	+	+
Carotenoids	--	--	--	+	+	+	--	--	--
Cardiac Glycosides	++	++	++	+++	+++	++	+	++	++
Quinones	--	--	--	--	--	--	--	--	--
Coumarins	+	+	+	+	+	+	+	+	+
Alkaloids	++	++	++	+++	+++	+++	++	++	++
Pseudotannins	++	++	++	+	+	+	+	+	+
Phenols	+++	+++	++	+++	+++	+++	++	+++	+++
Resins	+	++	+	+	++	+	--	--	--
Fixedoils and fats	--	--	--	--	--	--	--	--	--
Acids	--	--	--	+	+	--	--	--	--
Proteins	+	+	+	+	+	+	+	+	+
Lipids	--	--	--	--	--	--	--	--	--
Carbohydrates	+	+	+	+	+	--	+	+	+

Table III: Extractive values of *Terminalia catappa*

Plant part	Wt. of plant part(gms)	Extractive value (%)		
		Aqueous	Methanol	Ethanol
Bark	50	21.884	24.646	23.446
Leaves	50	26.664	26.068	24.84
Fruit	50	23.746	26.014	24.158



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