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PHYTOCHEMICAL STUDIES ON STEM BARK OF *CEIBA PENTANDRA* LINN

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ABSTRACT:

Ceiba pentandra.is one of such ayurvedic remedy that has been mentioned in many Indian medicinal literatures. It is crucially significant as it has the largest number of phytochemicals and secondary metabolites having pharmacological and biological properties. The present work deals with development and standardization of phytochemical analysis for quantification of stem bark extract of medicinal plant of *Ceiba pentandra* Linn. The scientific parameter is necessary to identify the exact plant material and to find its quality and purity. The present study deals with various preliminary phytochemical analyses of various successive extracts such as qualitative chemical analysis. Tannins, saponins, alkaloids and flavonoids content of stem bark of the title plant have been determined. These studies indicated the possible information for correct identification and standardization of this plant material.

KEYWORDS: *Ceiba pentandra* , Phytochemical Analysis, Bark Extract, Solvents.

INTRODUCTION:

There are a number of floras in use for medicinal purposes over the past several centuries. Countries such as China, India, and Egypt are well known for the

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active usage of medicinal plants in the treatment of various incurable diseases. India is the largest producer of medicinal herbs in the world due to which it is often called a botanical paradise. Ayurvedic science is deeply rooted in India and its neighboring countries. It was developed even before the medieval period, when people had little knowledge of science. There are a number of ancient therapeutic measures based on medicinal plants that have been developed in India (Dwevedi 2015)(Zaidan MR 2005)(Ahmad I 1998)(Bhakuni DS 1969). They can cure several diseases and ailments such as diabetes, cardiovascular disorders, cancer, and liver damage (Dwevedi 2015) (Ríos JL 2005) (Alekhya V 2013) (Kirana C 2003).

Tree bark is very complex in structure and has the potential of containing many primary and secondary metabolites. Products stored in the bark are useful for preparation of many drugs. The complex structure of the bark can be utilized for botanical identification to maintain the quality and purity of the drug (Usman *et. al.*, 2012). In the present study, attempts will be made on barks of medicinal trees which are available in Marathwada region by applying various techniques and parameters such as Morphology, Anatomy, Maceration, Pharmacognosy and Phytochemistry. The aim of present work is to develop the parameters to detect the genuinity of bark drugs, as the authentic material is prerequisites for the preparations of home remedies and for industrial use.parameters to detect the genuinity of bark drugs, as the authentic material is prerequisites for the preparations of home remedies and for industrial use.

*Ceiba pentandra*recently the plant has undergone extensive scientific research for its medicinal value. In Ayurvedic its bark decoction has been used as a diuretic, aphrodisiac, and to treat headache, as well as type II diabetes, in many countries in Africa, the bark is taken as remedies for diarrhoea, localized oedemas, wash sores, furuncles *leprous macules*, to relieve stomach complaints, hernia,

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blennorrhoea, heart-trouble, asthma, gargles for gingivitis, aphtes and sometimes toothache, also used in India and Malaya for bowel-complaint and West Africa for diarrhea, In Nigeria the bark infusion is used for febrifuge (Burkill, 1985). Nigeria it is used for bath, bark-decoction are considered excellent for curing evening fever especially those deemed to arise from evil influence (Dalziel and Hutchechinson, 1956). The stem bark is used locally as myriad of effects on medical conditions such as treatment of wounds, cough, high blood pressures, diarrhoea, dysentery, yellow fever and tumours (Sandhya, *et al*, 2011).

Tail trees with smooth, green stem and horizontally spreading whorled branches. Leaves digitate; leaflets 5-9, lanceolate, 5-12 cm long, cuspidate, green above, glaucous beneath; petioles 10-15 cm long; petiolules 2-3 mm long. Flowers 3-5 cm across, clustered in the leaf axils; pedicels 2-4 cm long. Calyx 1.2-2 cm long,5-lobed, glabrous outside, hairy.within; lobes triangular-ovate. Corolla dull white or pinkish; petals obovate-oblong, 3.5-4 cm long, woolly outside. Anthers sinuous. Ovary conical, 1.5-2 cm long, glabrous. Capsules fusiform, 3.5-4 cm long, hairy. Seeds pyriform, 5-6 mm long, black, embedded in silky wool (Naik, 1988).

MATERIAL AND METHOD:

Plant Material: The stem bark of *Ceiba pentandra* was collected from Pratishthan Mahavidyalaya, Paithan. The plant materials was identified and Authenticated by Dr. M. A. Kare, Department of Botany, Pratishthan Mahavidyalaya, Paithan.

Preparation of Extract: The stem bark of *Ceiba pentandra* shaded dried, and then these are made into coarsely powdered form using dry grinder. The powdered bark of the plant (180gm.) was packed in soxhlet apparatus and continuously extracted

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with petroleum ether (40-600C) till complete extraction, after completion of extraction the solvent was removed by distillation and then concentrated extract obtained was dried under reduced pressure using rotatory evaporator at temperature not exceeding 400C and then give moderate heating on water bath. A yellowish extract approximate 1 gm. was obtained. From the drug petroleum ether was removed and the defatted drug was extracted with methanol (95%) till complete extraction, after completion of extraction the solvent was removed by distillation and then concentrated extract obtained dried under reduced pressure at temperature not exceeding 400C and then give moderate heating on water bath. The methanolic extract obtained was dark yellow in color, weighed about 42.8 gm. The methanolic extract was kept in Petridis and it was stored in desiccators at cool place (Mukherjee 2001).

RESULT AND DISCUSSION:

Phytochemical test of *Ceiba pentandra*

Table No: 1 Observation of Quantitative analysis of organic of *Ceiba pentandra* .

Sr. No.	Quantitative Standards	%w/w
1	Total ash	7.12
2	Acid soluble ash	5.80
3	Acid insoluble ash	1.32
4	Water soluble ash	4.28
5	Water insoluble ash	1.34
6	Loss of weight on drying 105^0C	52.8
7	Alcohol soluble extractive value	6.73
8	Water soluble extractive value	6.32

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Table 2 Physico-Chemical Properties of *Ceiba pentandra* . stem bark.

Test	Methanolic Extract	Petro. Ether	Chloroform	Acetone
Tannins	+	-	+	+
Phenols	+	-	-	-
Alkaloids	+	-	-	-
Saponins	+	-	-	-
Iridoids	-	+	-	+
Quercetin	-	-	-	-
Kaempferol	-	-	-	-
Catechin	-	-	-	-
Coumarin	-	+	+	+
6,7-Dimethoxy coumarin	-	-	+	+
5-Methoxy genistein	-	-	+	-
Anthocyanin	-	+	-	-
Proanthocyanin	-	+	-	-
Carbohydrates	+	-	-	+
Flavonoids	+	-	+	-
Glycosides	+	-	+	-
Proteins	-	-	+	+

Table 3 Successive Extractive Values of the stem Bark of *Ceiba pentandra* .

Sr. No.	**Solvent**	**Weight of Drug**	**Average Extractive Value (%w/w)**
1	Methanol	10gm	5.4
2	Alcohol	10gm	13.1
3	Benzene	10gm	6.8
4	Petroleum	10gm	1.09
5	Chloroform	10gm	2.90
6	Acetone	10gm	4.21

In plants phytochemicals are naturally present. They give colour, flavor, smell and texture. A part from that, phytochemicals could prevent diseases including cancer and cardiovascular diseases and inhibit pathogenic microorganisms. Nowadays the use of medicinal plants rapidly

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increases in medicine (Renu 2005). Phytochemical evaluation of methanolic extract of *Ceiba pentandra* showed the presence of Tannins, Phenols, Alkaloids, Saponins, Iridoids, Quercetin, Kaempferol, Catechin, Coumarin, 6,7-Dimethoxy coumarin, 5-Methoxy genistein, Anthocyanin, Proanthocyanin, Carbohydrates, Flavonoids, Glycosides and Proteins.

Phytochemical screening of the bark showed some differences in the presence of phytoconstituents which are known to have importance in medicine (Sukumaran S 2011) (Kiruba S 2011) (Jeeva S 2011) (J. M. Jeeva S 2012) (Johnson M 2012) (AR, et al. 2014). The preliminary screening tests may be useful in the detection of the bioactive principles and subsequently may lead to the drug discovery and development (Joselin J 2013) (S. B. Joselin J 2012) (Florence AR 2012) (J. S. Joselin J 2014) (AR, et al. 2014).

Saponins are found only in petroleum ether extract. Chloroform extract revealed the presence of carbohydrates and saponins. Ethanol extract showed the presence of alkaloids, flavonoids, glycosides, phenols, steroids, terpenoids and quinones whereas acetone extract showed the availability of alkaloids, flavonoids, phytosterols, phenols and proteins. Such alkaloids were effective against ovarian, brain, breast, lung cancer etc (Sato N 1998) (Hsiang YH 1985) (Chen AY 1994) (Multon E 1989) and several of its semisynthetic analogues are 9-Nitro-CPT, 10-hydroxy-9-dimethylaminomethyl - CPT, 7-Ethyl- 10 -hydroxy-camptothecin (SN-38), are applied as clinical anticancer drugs in USA, Europe and Japan (Godwin S 1959). Other alkaloids include indicine, indicine N- oxide, thalicarpine and tetrandrine (Hartwell JL 1969). Flavonoids are also reported to have inhibitory action on growth and proliferation of different types of tumors (Netto 2007).

CONCLUSION:

Various extracts was subjected to Pharmcoganostic Evaluation for the identification of various Phytoconstituents and rest of extracts were utilized for pharmacological screening. Phytochemical evaluation extract of *Ceiba pentandra* showed the presence of Tannins, Phenols, Alkaloids, Saponins, Iridoids, Quercetin, Kaempferol, Catechin, Coumarin, 6,7-Dimethoxy coumarin, 5-Methoxy genistein, Anthocyanin, Proanthocyanin, Carbohydrates, Flavonoids, Glycosides and Proteins.

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