EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 10
Issue: 1
318-325
Year: 2023

PHARMACOGONSTICS STUDY AND PHYTOCHEMICAL SCREENING PHARMACOLOGICAL STUDY IN ACUTE ORAL TOXICITY, ANTI-INFLAMMATORY ACTIVITY STUDY EXTRACT LEAF OF TECOMA CAPENSIS

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Article Received on 19/11/2022 **Article Revised on 09/12/2022** **Article Accepted on 29/12/2022**

ABSTRACT
This plant study in the present chemical constituent different study plant activity of the plant, Pharmacological studies were also performed on anti-inflammatory Acute oral toxicity. These studies will be useful for establishing parameters for the standardization of drugs. The transverse section of the leaf of Tecoma capensis shows dorsiventral nature. The section is broadly divided into lamina and midrib regions. The T.S of the leaf shows lamina of leaf shows.

INTRODUCTION
The medicinal plants find application in pharmaceutical, cosmetics, agricultural, and food industries. The use of medicinal herbs for curing disease has been documented in the history of all civilizations. Man in the pre-historic era was probably not aware of the health hazards associated with irrational therapy. With the onset of research in medicine, it was concluded that plants contain active principles responsible for the curative action of herbs. Integrating the use of Traditional medicine (TM) in the treatment of incurable diseases such as AIDS to boost immunity is wiser than waiting for the immune system to weaken to begin antiviral therapy as is the common practice, especially when evidence exists that 11 of the anti-infective herbs in Chinese TM have shown to be anti-HIV. Chapter I Introduction Department of Pharmacognosy, MMC. 4 According to the WHO, 25% of modern medicines are made from plants first used traditionally. One recent example is Artemisinin-based drugs for treating malaria due to the malaria parasite exhibiting drug resistance to previously prescribed drug therapies. Traditional Chinese medicine has effectively treated malaria with cultivated Artemisia plants for over 2500 years. In South Africa, the medical research council is conducting studies on the efficacy of the plant Sutherlandia microphylla in treating AIDS patients. Traditionally used as a tonic, this plant may increase energy, appetite, and body mass in people living with HIV. Diabetes mellitus is another area where a lot of research is going on. Ajuga reptens (the active principle is said to potentiate effects of insulin), Galagea Officinalis (garage), Bougainvillea spectabilis (pinitol), Momordica charantia (chanting), Gymnema Sylvestre (gymnemic acid) are some medicinal herbs that have shown effectiveness in non-insulin-dependent diabetes. Recently extract of Tecoma stans has shown potent anti-diabetic activity. Alkaloid tecomonine is considered to be an active principle of the herb. Arthritis is another potential disease where no satisfactory answer is present in modern medicine. Commiphora Mukul (guggulsterone), Boswellia serrata (boswellic acid), Withania somnifera (withanolides), and Ruscus accelerates (ruscogenin) are prominent plants with anti-arthritic activity. Croton sublyratus (plaunoyol) has a potent and wide spectrum of anti-peptic ulcer action. Ancistrocladus korupensis (michellammine-b), Caulophyllum langigerum (calanolide-A), Caulophyllum tympani (costatolide-A), Homalanthus natans (prostratin) are the medicinal herbs from African countries that are being employed in research for finding a suitable cure for Aids.

Conservation of medicinal plants
The traditional knowledge system in regard to herbal medicine in Assam is being practiced by the rural communities for a long back. Now it is becoming an urgent need for the rural dwellers of the region ftoa scientific way of collecting thdicinal plant species from forest areas as few of them are in the endemic stage. Conservation of biodiversity which nourishes the tribals and forest dwellers is also equally important, if traditional knowledge has to be preserved just like habitat conservation for species and as a whole, if tribals are to be protected from extinction, forests are also to be preserved accordingly. It has to be appreciated that wherever tribes exist there exist the fos. Dutta et al.

(2013) have emphasized the fact that there must be Government intervention regarding the conservation and cultivation of medicinal and aromatic plant species within a particular region. Commercial collection of traditional medicinal plants from tribal dwellings, and habitats also are to be controlled. Apart from the conservation of forests, tribals should be encouraged to raise their ethnobiological gardens or herbal gardens in their vicinity 321 Int. J. Med. Plants Res. (Ballick, 1Ballackuch gardens serve the interests of the tribal and they at the same time ensure the conservation of the depleting biodiversity in medicinof plants of India (Rao, 1996). From the recent survey and assessment conducted by the Department of Environment and Forests under the NaRMIL (AACP) Project for "National Consultancy for Formulation of a Marketing Framework, Training and Extension support to the Joint Forest Management Committees (JFMCs) on Marketing of Non-Timber Forest Products (NFTPs)", through the "Green cover Overseas" (website: www.greencover.org), it is apparent that many of the rare and endangered species of MAPs are sold out departmentally under the pretext of NTFPs. Table 2 depicts the number of such species annually sold out at rates and prices which are abysmally low. The collection of such plants and herbs also does not conform to any kind of management plan which quantifies the process of harvest and collection. One could only presume that such sales of this commodity are destructive.

Standardization

As the commercialization of herbal medicine has occurred, the certaintythe of safeness, peculiarity, and potency of medicinal plants and herbal products has become an essential issue. The herbal raw material is susceptible to a lot of variation due to some issues, the important ones being the identity of the plants and periodic dissimilarity, the ecotypic, genotypic, and phenotypic differences, drying and storage conditions, and the existence of xenobiotic

History of medicinal plants

Plants have been used for medicinal purposes fDPPH Scavenging byDPPH Scavenging Byrom 5000 BC with the emergence of the Indus Valley Civilization. The indigenous system of medicine, viz.-Ayurvedic, Siddha, and Unani, has been in existence for several centuries. The country has 45,000 different plant species and 15000 medicinal plants that include 2000 plants used in Ayurveda, 700 in Unani, 600 in Siddha, 450 in Homoeopathy, and 30 in modern medicines. The drugs are derived either from the whole plant or from different parts like leaves, stems, bark, root, flower, seed, etc. Some drugs are prepared from excretory plant products such as gum, resins and latex.

Tecoma capensis

Tecoma capensis, the Cape honeysuckle, is a species of flowering plant in the family Bignoniaceae, native to southern Africa. Despite its common name, it is not closely related to the true honeysuckle.

Tecoma capensis (Thunb.) Lindl
T.capensis var. harmony
T.capensis var. yellow
T.capensis var. pink
T.capensis var. red
Tecoma x smithii
Wil. Wats, T.radicans (L.) Juss
T.grandiflora (Thunb.)

A. Flowers

The flowers are zygomorphic, hermaphrodite (bisexual), and have no characteristic odor, however, flowers are very attractive to insects that have long bell-shaped five-lobed sympetalous calyx, and trumpet

B. Seeds: - Ten compounds were identified in the seeds of T. capensis (Thunb.) Lindl. As too as the following: 6 flavonoids, 2 alkaloids, 1 phenolic acid, and 1 quinone. These results indicate that seeds are rich in flavonoids.

B. Fruits:- Six compounds were identified in the fruits of T. capensis (Thunb.) Lindl. as too the following: four iridoids, 1 alkaloid, and 1 fatty acid. These results indicate that fruits
are rich in iridoids

Plant Profile

Fig of plant Tecoma *capensis.*

Scientific Classification
Domain:> Eukaryota
Kingdom>: Plantae
Phylum: >Spermatophyta
Subphylum: > Angiospermae
Class: >Dicotyledonae
Orde > : Scrophulariales
Family>: Bignoniaceae
Genus: >*Tecomaria*
Species: > *capensis*

MATERIAL AND METHODS

Chemical

Organic solvent Ethyl Acetate, Chloroform, Water, Methanol, Hydro Alcoholic, etc., and every typeof chemiused e as a working time of activity Acute oral toxicity:: As per OECD guidelines 423.

Preparation of leaf extract

The plant Tecoma capensis has been selected and the plant collected leaves and dried at room temperature without sunlighd ground powder is used in the grinder, the powder was extracted hydrochloric were evaporated and used rotary evaporator and hot air oven used dried, and resulted in crud extract preserved in packed containers and tightly closed container cap and then further analysis.

RESULT AND DISCUSSION

Pharmacognostical Evaluation

Microscopy Evaluation of Leaf

Transverse Section of (T.S) of Leaf

The transverse section of the leaf of Tecoma capensis shows dorsiventral nature. The section is broadly divided into lamina and midrib regions. The T.S of the leaf shows lamina of leaf shows.

Upper Epidermal cell -: polygonal, nearly isodiametric with wavy walls.

Lower epidermal cells- are similar to upper epidermal cells but they are more wavy walls.
Trichomes-Branched non-glandular, unicellular, and multicellular non-glandular trichomes are present.

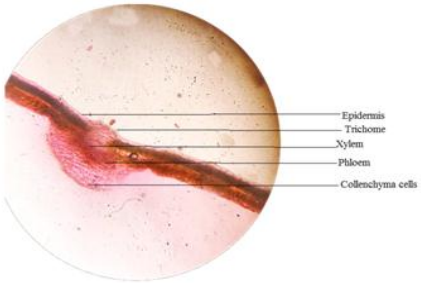
Cortex-: Thick layers of collenchyma cells, small intercellular space.

Vascular bundle:- very small in size, open collateral arranged in crescent-shaped groups forming of an almost continuous ring, showing xthe ylem upwards and the phloem downwards.

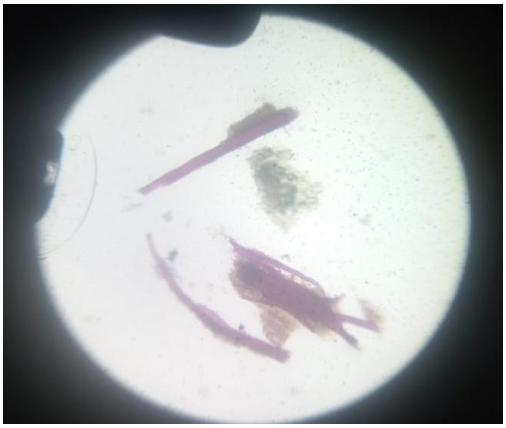
Xylem-: The xylem vessels are lignified, arranged in rows, with annular and spiral thickenings. The parenchyma cells are rectangular having pitted lignified walls.

Phloem-: is comparatively narrow and consists of thin-walled cellulosic phloem elements, sieve tubes, companion cells, and phloem parenchyma with no fibers.

Stomata: Antimycotic stomata with four or five subsidiary cells with no definite shape.



T.S oF Leaf of Tecoma capensis



The fiber in Powder microscopy at 100X

Determination of Physicochemical Parameters

Ash value

Procedure:- For the determination of different ash values, the leaf and stem bark of Tecoma capnsis were powdered. The powder was passed through sieve no. 40 & used as follows

Total ash value

2 gm of powder drug was incinerated in a tarred silica dish at a temperature not exceeding 450 C until free from carbon. Cooled and weighed. If carbon-free ash cannot be obtained in this way, exhausted the charred mass with hot water, collected the residue on an ashless filter paper, evaporated to dryness, and ignite at a temperature not exceeding 450 c. the / age of total ash concerning the air-dried drug was calculated by using Eqn. (4.1)

Acid in-soluble value

Acid insoluble ash obtained from total ash, placed in a silica dish, added 25 ml hydrochloric acid (2N) was covered with a watch glass boiled for 10 min. and allowed to cool, Collected the insoluble matter on an ashless filter paper washed with hot distilled water until the filtrate was natural, dry, ignited to dull redness allowed to cool in desiccators, and weighed. The procedure was repeated until the difference between two successive weighings was not more than 0.1g. Acid insoluble ash concerning the air-dried drug was calculated.

Water-Soluble Ash Value

Water-soluble ash was obtained from total ash, placed in a silica dish, added 25ml of water, and boiled for 15 min. collected the insoluble matter was in an ashless filter paper. Washed with hot water and ignited in a silica dish for 15 min, at a temperature not exceeding 450c.

The weight of this residue was subtracted from the weight of the total ash. The / age value of water-soluble ash concerning the air-dried drug was calculated.

Ash values

S.No.	Analytical parameter	Ash value (%w/w)
1.	Total Ash	2.7 %
2.	Acid-Insoluble Ash	1.2 %
3.	Water-soluble Ash	1.7 %

Loss of Drying

Loss of drying of the air-dried leaves of Tecoma capensis was analyzed. Accurately weighed quantity of sample was taken in a tarred glass bottle and initial weight was taken. The sample was heated at 150c in an oven and weighed. This procedure was repeated until a constant weight was obtained. The moisture content of the sample was calculated concerning air-dried drugs and the results are in.

Determination of Extractive Values

The extract obtained by exhausting crude drugs is indicative of approximate measures of their chemical constituents. Taking into consideration the diversity in chemical nature and properties of the drug, the various solvent was used for the determination of extractive value. The solvent was used for extraction in a position to dissolve appreciable quantities of the chemical substance desired.

Water-Soluble Extractive Value

5gm of the powdered drug was accurately weighed and placed inside a glass Stoppard conical flask. It was macerated with 100 ml of water for 18 hours. it was filtered and about 25 ml of filtrate was transferred into a china dish and was evaporated to dryness on the water, cooled, and finally weighed.

Alcohol Soluble Extractive Value

Alcohol was used as a solvent in place of water and the remaining procedure was the same powder as that of water-soluble extractive value.

Extractive values

S. No.	Analytical parameter	Leaf extract Color	Bark extract Color	Appearance of residue	Extractive value % w/w
1	Ethanol soluble extractive	Brown	Brown	Sticky	13.09%
2	Water-soluble extractive	Green	Yellowish	Sticky	15.08 %

Successive Extraction of Leaf/ Stem Bark

Preparation of Extract

The fresh leaves / dried stem bark of Tecoma capensis were taken, then cut into pieces, shade dried and coarsely powdered. The coarse powder was extracted with different solvents (Pet ether, Chloroform, Ethanol) as per increasing polarity by using the differential method in the Soxhlet apparatus.

Preliminary Phytochemical Screening Studies

Extracts obtained from different solvents were subjected to various chemical tests for the determination of phytoconstituents.

Test for Flavonoids

Shinoda test: To the test solution added a few magnesium timings and concentrated hydrochloric acid dropwise, pink scarlet, a crimson red color appeared after a few minutes.

Alkaline reagent test: To test the solution added a few drops of sodium hydroxide solution intense yellow color was formed which was turned colorless with on addition of a few drops of dilute acid indicating the presence of flavonoids.

Zinc hydrochloride test: To the test solution added a mixture of zinc dust and conc. Hydrochloride acid. It was giving red color after a few minutes.

Test for saponins

Foam test: Take a small quantity of extract separately and 20 ml of distilled water and shake in a graduated cylinder for 15 minutes lengthwise. A 1cm layer of foam was observed indicating the presence of saponins.

Test for alkaloids

Dragendorff's Test: To 1 ml of the extract, added 1 ml of dragendorff" reagent (potassium Bismuth iodide solution). An orange-red precipitate was observed indicating the presence ofan alkaloid.

Mayer's test: To 1 ml of the extract, added 1 ml of Mayer's reagent (Potassium mercuric iodide solution). The whitish-yellow or cream-colored precipitate was observed indicating the presence of alkaloids.

Hager's test: To 1 ml of extract**,** added 3ml of Hager's reagent (Saturated aqueous solution of picric acid). Yellow-colored precipitate indicates the presence of alkaloids.

Wagner test: To 1 ml of the extract with a few drops of Wagner reagent (Iodine in potassium iodide) formation of a reddish-brown precipitate indicates the presence of alkaloids.

Test for Steroids and Sterols

Salkowski test: Dissolved the extract in chloroform and added an equal volume of conc. H2SO4 Bluish red to cherry color in the chloroform layer and green fluorescence in the acid layer were observed that represent the steroidal components in the tested extract.

Libermann-Burchard test: 1gm of the extract was dissolved in a few drops of chloroform.3 ml of acetic anhydride and 3 ml of glacial acetic acid were added, heated, and cooled under the tap, and drops of concentrated sulphuric acid were added along the sides of the test tube. The bluish-green color was observed showing the presence of sterol.

Test for amino acids

Ninhydrin test: Added two drops of freshly prepared 0.2/ ninhydrin reagent (0.1/solution in n-butanol) to the small quantity of extract and heart. The blue color was observed to reveal the presence of proteins, peptides, or amino acids.

Test for carbohydrates

Molisch's Test: To 2 ml of the extract, added 1 ml of naphthol solution and concentrate sulphuric acid through the side of the test tube. Purple or reddish-violet color was observed at the junction of the two liquids revealing the presence of carbohydrates.

Test of protein

Biuret test: Added 1 ml of 40 / sodium hydroxide solution and 2 drops of 1/ CUSO4 solution till a blue color was produced and then added the 1 ml of the extract. The pinkish orpurple-violett color was observed indicating the presence of 0f proteins.

4. Lour product shows the presence of tannins.

Extract +Lead acetate solution: Take talittle quantity of extract and mixed with basic lead acetate solution. The formation of white precipitates indicates the presence of tannins.

Test for vitamin C: Dilute 1ml of 2/ w/v solution with 5ml of water and added 1 drop of Added 0.6 ml of hydrochloric acid dropwise and stirred, the yellow color turned to blue indicating the presence of vit. C freshly prepared 5/ w/v solution of nitroprusside and 2 ml of dilute sodium **2.8.7.2**

Millon's Test: 1ml of test solution was acidified with sulphuric acid and added million's reagent was and boil this solution. A yellow precipitate was formed which indicates the presence of protein (Sood et al 2012).

Tennis

Extract+5/ ferric chloride solution: To 1 ml of the extract, add 1 ml of 5/ ferric chloride solution, formation of a dark blue or green-black color. hydroxide solution.

Phytochemical screening

Phytochemical screening of leaf of *Tecoma capensis.*

Test	Pet. Ether	Chloroform	Alcohol	Aqueous
Alkaloids				
Dragendroff "s test	-	+	-	+
Cardiac glycosides				
Keller-killing test	-	-	+	-
Legal "s test	-	-	+	+
Carbohydrates				
Molisch"s test	-	+	+	+
Fehling's test	-	+	-	+
Benedict's test	-	+	+	+
Protein				
Tyrosin test	-	-	+	+

Ninhydrin test	-	-	-	+
Tannins	-	-	+	-
Flavonoids	-	+	+	-
Saponins	-	-	-	+
Fatty acids & oils	+	-	-	+

Phytochemical screening of stem bark of *Tecoma capens*is.

Test	Pet. Ether	Chloroform	Alcohol	Aqueous
Alkaloids				
Dragendroff "s test	-	+	-	+
Cardiac glycosides				
Keller-killing test	-	-	+	-
Legal "s test	-	-	+	+
Carbohydrates				
Molisch"s test	-	+	+	+
Fehling's test	-	+	-	+
Benedict's test	-	+	+	+
Protein				
Tyrosin test	-	-	+	+
Ninhydrin test	-	-	-	+
Tannins	-	-	+	-
Flavonoids	-	+	+	-
Saponins	-	-	-	+
Phenols	-	+	+	+
Fatty acids & oils	+	-	-	-

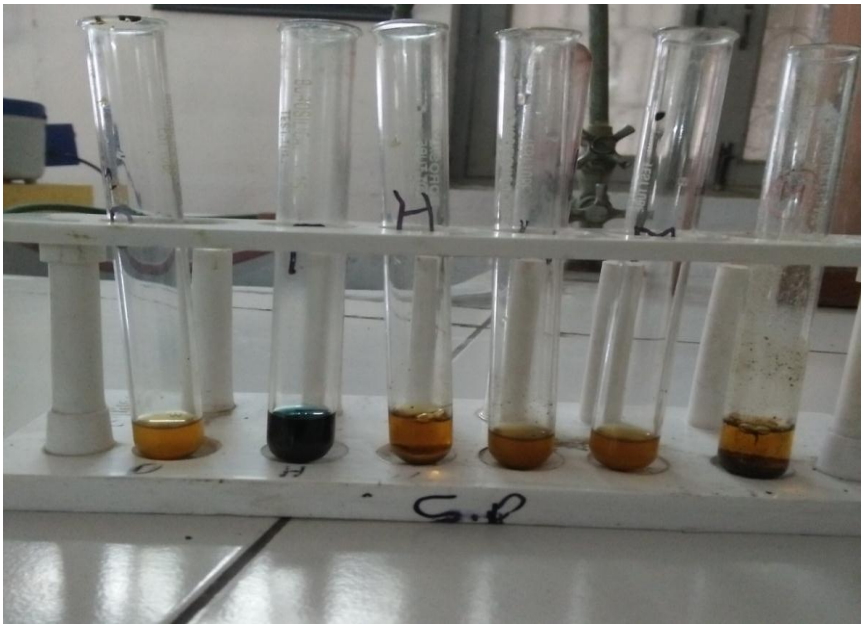


Fig of Phytochemical screening tes.

Pharmacological evaluation

Acute oral toxicity study

Acute oral toxicity Is the adverse effect occurring within a short time of oral administration of a single dose of a substance or multiple-dose given within 24 hours. The highest attainable dose of 2000 mg/kg will be used as per the organization for economic cooperation and development (OECD) guideline 423. three rats, each sequentially dosed at an interval of 48 hours, will use for the test once daily cage side observation includes changes in skin fur mucus membrane (nasal), eyes autonomic salivation, lacrimation perspiration, piloerection, urinary incontinence, and defecation) and central nervous system (drowsiness, gait, tremors, and convulsion) changes. Mortality, if any, will be determined over 2 weeks.

Anti-Inflammatory Activity

Effect of Ethanolic Extract of Leaves on *Tecoma capensis* Inflammation of Rats.

Treatment	Dose (mg/kg)	60 min	120 min	180 min	Inhibition (%)
Control	-	0.61±0.012	0.65±0.033	0.72±0.011	67.09
Standard	10	0.46±0.01	0.33± 0.014*	0.24±0.011	64.60
TCE	100	0.52±0.011*	048±0.011*	0.43±0.14*	37.25
TCE	200	0.53±0.014**	0.45±0.010**	0.36±0.020**	46.19
TCE	400	0.56±0.005**	042±0.011**	0.35±0.087**	48.45

Data are expressed as mean± SEM: n=6 in each group. Values in parenthesis are percentage inhibition in comparison to control group compared to the control group (One-way ANOVA Followed by Dunnett's test); *: P ≤0.05, **:P ≤0.01, and ***:P ≤ 0.001

CONCLUSION

Tecoma capensis (*T. capensis*) Thumb. (Bignoniaceae), commonly called a cape- honeysuckle, an evergreen and fast-growing climbing shrub which may go up to 2-3 m high and spread more than 2.5 m. It is grown as an ornamental plant in gardens. The plant loses its leaves in a colder climate. It has pinnately compound leaves that have oval leaflets with blunt teeth. Flowers are orange in color, tubular, and attract nectar-feeding insects and birds. Some species of the genus *Tecoma* are *T.grandiflora* (Thunb.) Loisel, *T. radicans* (L.) Juss, *T. smithii* Wil. Wats *T.capensis* (Thunb.) Lindl, and finally *T. capensis var. harmony*. Traditionally the leaves were used to treat pneumonia, enteritis, diarrhea, tonic, and analgesic antimicrobial, antifungal, antipyretic, and antioxidant activity. The bark infusion is used to treat sleeplessness to induce sleep and is also used as an analgesic, antidiarrhoeal and antipyretic. So the plant *Tecoma capensis* has been selected for pharmacognostical and pharmacological studies. The present study aimed that the plant *Tecoma capensis* can be used effectively as an herbal medicine at a low cost.

In macroscopically examination it was observed that the *Tecoma capensis* stem bark is branched, erect or spreading, sometimes shrubby much-branched, 0.2-1m tall, glandular-pubescent, olive, and pale brown. The stem has hairs between the nodes and the hairs on the stem are distributed more or less uniformly. The flowering stem is circular, or with lots of small angles so that it is roughly circular and in macroscopically examination of the leaf of *Tecoma capensis* it was observed that the leaf is compound, 10-20 mm in length, and 1.5-2.3 cm in width, Fresh leaves are green and dry ones are yellowish-green, the surface is not pubescent and the base is rounded. In microscopically examination the herbaceous stem consists of the cuticle, covering trichomes, epidermis, cortex, phloem fibers, medullary rays, xylem, phloem, pith, and in powder microscopy the presence of crystals of calcium oxalate, cork cell, tracheids, cortex, Covering trichomes, spiral vessel, xylem vessel were observed. In microscopically examination of the leaf the presence of the Upper epidermis, Lower epidermis, covering Trichomes, Vascular bundle consisting of the cuticle, xylem and phloem, Collenchymas, Sclerenchyma, Spongy parenchyma and Palisade cell, trichomes, stomata, crystal sheath, anamocytic stomata were observed and in powder examination, the presence of starch grains, calcium oxalate crystal, unicellular trichomes, crystal sheath, Epidermal Cell with stomata and Multicellular trichomes are observed. The physicochemical parameters like ash value and extractive value were also performed and their percentage (w/w) was calculated. The preliminary phytochemical screening revealed the presence of alkaloids in the leaf only and carbohydrates, protein, amino acids and flavonoids, and phenols in both plant parts (leaf as well as in stem bark). The thin layer chromatography was also performed and their different R_f values were noted the solvent systems were developed by running the plates on a trial basis in different solvent systems in different ratios and finally, **(**Chloroform: Methanol) (5:3) solvent system was selected for a hydroalcoholic extract of stem bark and (Ethyl acetate: Toluene: Acetic acid) (5:4.0.1) was selected for a hydroalcoholic extract of the leaf. And (Ethyl Acetate: n-Hexane) (1: 4) solvent system was selected for the chloroform extract of the leaf and (Ethyl acetate: n-Hexane) (3: 2) was selected for the chloroform extract of the leaf.

ACKNOWLEDGMENT

First I thank **God** and my family for giving me patience, courage, and abundant blessings power conducting the study, and helping me in every walk with all that I have got.

I take this opportunity to express my deep sense of gratitude, and respect to my esteemed teacher and guide **Director**, **Institute Of Pharmacy Bareilly** for his support guidance, and encouragement throughout this work. I am extremely thankful for providing me with all the necessary facilities required for the completion of my research.

Last but not least my deepest gratitude goes to my parents and my family in **Dharam Pal Verma, Nandram Verma** for their continuous encouragement support, and interest throughout my studies.

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