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Exploration of the Pharmacognostical Studies and Anti-Pyretic In-Vivo Evaluation Utilizing Hydroalcoholic Extract of *Streblus Asper* Leaf in Rats.

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KEYWORDS

Strebulus asper, Hydroalcoholic extract, Anti-pyrectics, Pharmacognostical, Microscopic study.

ABSTRACT:

This study delves into the Pharmacognostical properties of a hydroalcoholic extract derived from Streblus asper leaves, a plant well-regarded in various traditional medicine systems. Aiming to uncover its therapeutic potential, the research focuses on understanding the extract's pharmacological attributes. Employing a combination of analytical methods and experiments, including in-vivo assays on rats, the study meticulously evaluates the extract's efficacy as an antipyretic agent. The hydroalcoholic extract of Streblus asper leaves demonstrated significant antipyretic activity in the animal model. The treated group showed a marked reduction in fever compared to the control group, indicating the potential of this extract as a natural fever remedy. By meticulously examining its pharmacodynamic effects, the research strives to elucidate the mechanisms behind its anti-fever properties. The findings not only broaden our understanding of Streblus asper's medicinal value but also offer valuable insights into its potential application for fever management. Exploring its Pharmacognostical characteristics lays the groundwork for identifying its bioactive components and their pharmacokinetic profiles, paving the way for further pharmacological research and drug development. Additionally, demonstrating its anti-pyretic effects in animal models underscores the potential of Streblus asper extract as a natural remedy for fever-related conditions .Overall, this research not only enriches our knowledge of traditional medicinal plants but also highlights the importance of harnessing natural resources for developing novel therapeutics in the field of pharmaceutical sciences.

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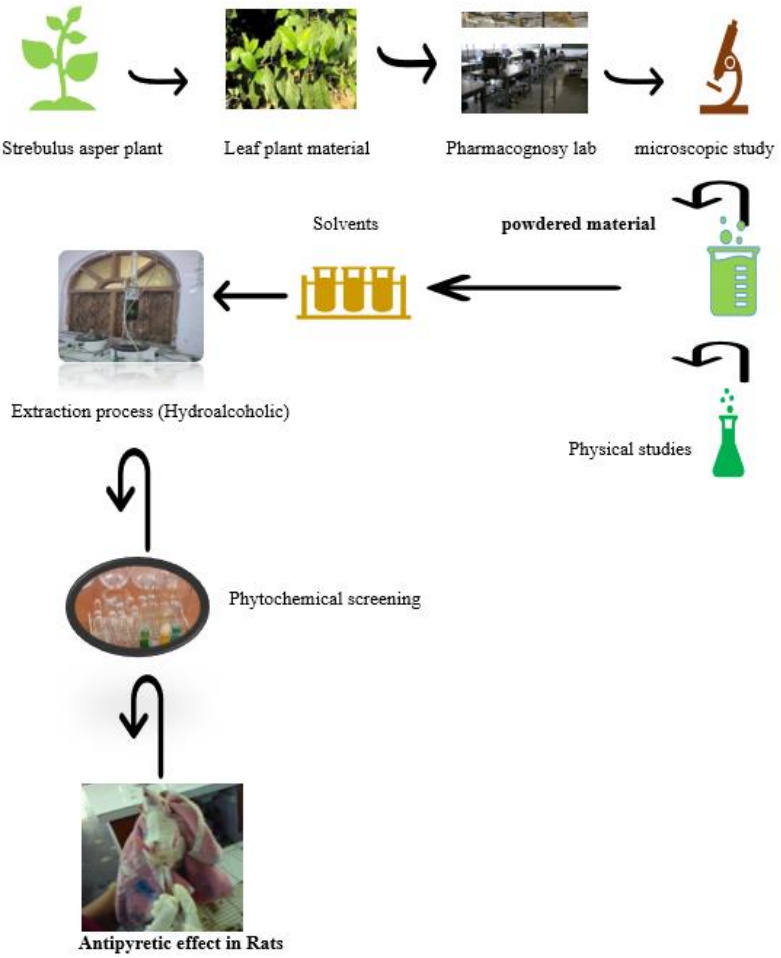
Pictorial graphical abstract:



1.0 Introduction:

- As a nature imposes various problems, but due to kind hearted it also provides various solutions. In ancient times, prior history to the advents of enlightenment civilization and modern industries, diseases existed, yet later nature's medicinal plants herb served as various remedies. Despite principle of human advancements in synthesizing to produce medicine, some medicinal plants such exhibit pharmacological activities and their phytoconstituents in a laboratory remains a formidable task [1]. A notable folk plant *Streblus asper* Lour (Family: Moraceae), within the common 'Fig' family, is predominantly get going in across Asia in different regions like tropical and subtropical. Recognized in various Pharmacopeia's like the Ayurvedic Pharmacopoeia as well as in various medicinal plant monographs, S. asper has been used for generations in traditional Indian medicine. This plant contains many beneficial compounds, particularly cardiac glycosides. Researchers have found and extracted over 20 different cardiac glycosides from the root bark of S. asper.
- [2]. It is recognized by multiple various appellations, such as Bar-inka, Berrikka, Rudi, Sheora, Koi, Siamese rough bush, and Toothbrush tree In India, it goes by various number of vernacular names, such as Shakhotaka (in a Sanskrit), Siora (Hindi terms), Sheora (Bengali-terminology), and Piray (Tamil). Pea-shaped fruits, and the perianth exhibits a yellow hue surrounded in fruits. Its geographical habitat spans in the arid regions of several state in India, such as Andaman Islands, extending from Rohilkund eastward and Travancore, Penang [3]. The body's core temperature is regulated by the hypothalamus, which sets a baseline temperature. Fever, or pyrexia,

Journal of Chemical Health Risks

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JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

occurs when this baseline temperature is elevated due to various causes, including infections, inflammation, malignancy, or autoimmune reactions. These triggers prompt the release of immune mediators that signal the hypothalamus to raise the body's temperature, leading to fever [4]. For Ailments such as leprosy, piles, diarrhea, dysentery, and elephantiasis, among others various diseases are improve throughout utilize stem bark of *S.asper* as a folk and indigenous medicine. In Despite it is extensive for traditional use, A notable absence of systematic post studies its potential anticarcinogenic effects, specifically its antimitotic, cytotoxic, and antitumor activities show, in relation to content using of various secondary metabolites. Hence, the present research to fill this gap by studies these properties of the bark extract (Anm alamgir et al, 2013) [5]. As a poststudies confirmed that the therapeutic effects of *S.asper* leaf extract, potential evaluated including antibacterial, antiseptic, antidiarrheal, antidiabetic, antioxidant, and anti-Parkinson's properties. Additionally also research estimate that *S.asper* leaf extract could exibit the different biological screening model like carrageenan-induced paw edema in rats by reduce the expression of COX-2 and i-messenger Ribonucleic acid. While evidence on the anti-inflammatory effects of *Strebulus.asper* extracts is limited, a study aimed to evaluate the aqueous *S.asper* leaf extract's anti-inflammatory activity through in vitro lipoxygenase assay and in vivo experiments on xylene-induced ear edema in mice. This research aims to provide insights into potential treatments for neurodegenerative disorders associated with neuroinflammation (Singsai, K ,et al 2020) [6].

1.1 Plant profile: [3,7]

Botanical Name: *Streblus asper* Lour.

Taxonomic Classification:

Kingdom: Plantae

Order: Rosales

Family: Moraceae

Genus: Streblus

Species: S. asper

Vernacular (local) names:

Hindi - Sihora, Sheora

Oriya - Sahada

English - Toothbrush tree

Habit: *Streblus asper,* a proteaginous tropical tree, a storied legacy of folk medicinal value applied on embraced by a diverse nature cultures, as proven by its suggested in ancient historical texts such as Ayurvedic Pharmacopoeia. It has involved in spread widely utilization in indigenous system of medicine to enclosed a myriad of health concerns.

Habitat: By Originating from an arid landscape across various countries such as Indonesia, Cambodia, Thailand, India, Sri Lanka, Malaysia, and Vietnam, this a tree with moderate-sized flourishes primarily found in the subtropical zones of India, remarkable habitat resilience to a widely range of soil compositions and properties.

Fig 01- Plant Leaves of *Strebulus.asper*

2.0 Material and method:

2.01 Plant material collection:

The plants were collected from *Jamadarpali*, a place in the Sambalpur district of Odisha. Maximum bioactive phytoconstituents present in morning time and early late winter season. Plant collection from forest area of jamdarpali, Sambalpur district in morning time.

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

2.02 Pharmacognostical methods:

i) External sense organ evaluation: Organoleptic examine throughout involves drugs sensory organs. It encompasses evaluation various characteristics such as colour, Flavour, shape, odour and tactile qualities. Mainly, the Physical appearance of a plant part is distinctive enough to aid in identification. Alternatively, specific odours or tastes may further aid in identification. Morphology entails studying the adulteration of a crude drug, while morphography involves describing adulterant and its form effectively [8]. Leaves of *Strebulus asper* are examine throughout sensory organ and Vanier calliper for size.

ii) Cellular structure analysis:

Microscopic evaluation is vital for recognize crude drug's cellular structure and detecting adulteration. This finest process involves for examining section cutting under a microscope to identify characteristic cellular tissue features in a unique to each and various medicinal plant. While it is primary assessment evaluation but also other analytical techniques contribute to assessment. Evaluation cellular features can be performed through thin sectioning, which allowing for clear visibility of tissue arrangements [9,10]. A precise cross-section throughout sharp blade of the leaf's mid-rib and part of the lamina, despite boiling with heating mantle in a chloral hydrate solution for 15-20 minutes to decrease chlorophyll and pigments layer of leaves. After mounting solution for remove moisture content, add on a glass slide with glycerine, and observed under a microscope. T.S of the *Streblus asper* Lour leaf immerged a bifacial structure, showcasing various important tissues features within the area of lamina and midrib[11].

iii) Quantitative microscopy:

A) Vein-islet number & Vein-Termination number:

Materials : Fresh Leaf, Stage micrometer, Chloral hydrate solution, Camera Lucida.

A fresh leaf of *S.asper* segment was selected in carefully from with a point equal distance between the midrib and the lamina edge, then mixed with a chloral hydrate solution to achieve maximum clarity. Despite then a 16mm measured by using objective lens, a stage micrometre, with a camera lucida apparatus, a 2x2 mm square cut was meticulously sketched done onto the surface of *S.asper* leaf. Subsequently, for prepared sample was mounted with glycerine, and the vein islets contained within the grid were accurately depicted. After that, total count of vein islets within the square mm was then separated by four to ascertain the vein-islet density. **Result is discussed in Table no 01**.[12,13]

B) **Stomatal Number and stomatal index:**

The stomatal number, recognize reflects average number of stomata per square mm on a epidermal cell of leaf's, yet maintaining a consistent ratio and exchanges gases between upper and lower surfaces within a leaf surface. From calculating Stomatal index represent the percentage of epidermal cells on formation stomata through leaf surface, remaining relatively stable regardless of external factors. Both measures are by determined using microscopic evaluation, involving various counting stomata and epidermal cells within correct areas on leaf upper and lower epidermis, important or crucial for understanding adulteration on leaf stomatal features across various samples.[14] **Result discussed table on 01.**

$$\text{Stomatal Index (SI)} = \frac{\text{Number of Stomata}}{\text{Number of Stomata + Number of Epidermal Cells}} \times 100$$

iv. Powder *Strebulus asper* fluorescence Analysis:

Numerous of various crude drugs exhibit their fluorescence property upon exposure upon to ultraviolet (UV) radiation. It is mainly crucial to evaluate many substances for their imperative reaction with many chemical reagents utilization under by UV light. The fluorescence studies of crude drugs powdered drugs were examined under Ultra violet light of various treatment with different chemical reagents, and the findings result are documented on Table no 02. [15,16] **Result discussed table on 02.**

V. Physiochemical *S.asper* leaf Examination:

A) Ash value:

The examination of ash values in herbal drugs is vital for determining the inorganic residue content, such as phosphates, carbonates, and silicates. These values serve as crucial indicators, offering insights into the quality and purity of the herbal medicine. By eliminating organic matter during the ashing process, any potential interference in subsequent analyses is minimized, ensuring accurate results. Ash is categorized into physiological and non-physiological types, with physiological ash originating from plant biochemical reactions, while non-physiological ash does not arise from such reactions.[17]

i. Total ash value:

Journal of Chemical Health Risks

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JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

Accurately approximately weighing 2 grams of air-dried powdered crude *S.asper* leaf in a tared platinum or silica dish, the powder above sample was incinerated at temperatures below 450°C until remove inorganic matter or carbon-free, despite then cooled, and reweighed the sample. The resulting carbon free powdered residue was collected on ashless filter paper and again incinerated until the ash turned white with the paper. Subsequently, by adding the filtrate, untill evaporated to dryness and temperatures at incinerated not exceeding 450°C. The percentage of total ash concerned the air-dried ash powdered weight was then calculated.[18,19] **Result discussed table on 03.**

ii. Acid insoluble ash:

Add sufficiently dilute hydrochloric acid to total ash, collect the insoluble matter on ashless filter paper, and then washing with water to be neutral, transfer back to crucible , dry, ignite with help of muffle furnace, cool in desiccator for 20 minutes . Then weigh, and calculate acid-insoluble ash against air-dried crude drug[20]. **Result discussed table on 03.**

iii. Water soluble ash:

Subsequently by addition of 25 ml of distilled water to the crucible with the total ash and heating for respectively 5 minutes. Gather or collect the sufficient insoluble matters residue in either on ash-free filter paper. By thoroughly Rinse with warm water and applied heat in a silica crucible at a optimum temperature that not exceed 450°C for 15 minutes. Further mate deduction weight of this obtain residue in milligrams calculation from the total ash weight. Determine the water-soluble ash content in mg per gram of air-dried substance [21]. **Result discussed table on 03.**

iv. Sulphated Ash:

Despite the Heated a crucible, cool in desiccator, and weigh. By addition 1 gram of *Strebulus asper* leaf drug powder, in a weighing balance again. until charred incinerate properly and cool. Furthermore, moisten with dilute sulfuric acid and properly heat, incinerate until no black particles remain incinerate at 800°C. Repeat, process by adding sulfuric acid, reheating, and incinerating until consistent weight is achieved [18]. **Result discussed table on 03.**

B. Phytoconstituents Solubility in a Particular solvent determination:

Take 4 grams of powdered air dried *Strebulus asper* leaves, grind it coarsely particles, and transfer it in a stoppered conical flask. Cold macerate the powdered drug with 100 ml of different solvent used like polar and less polar solvents for 24 hours. Further shaking with the mixture periodically for 6 hours and settle for the remaining 18 hours shaking in different time interval. Then Filter the mixture swiftly, confirm no loss of solvents. Evaporate filtrate of 25 ml to dryness in a previously-weighed shallow dish, then dry at 105°C in hot air oven and reweigh by weighing balance. Calculate the percentage of extractive based on the weight of the air-dried drug [21]. **Result discussed table on 03.**

C. Cellulose, mucilage determines through swelling index method:

Place 1 gram of powdered *Strebulus asper* leaves drug into a stoppered glass on measuring cylinder with roughly an internal diameter 16mm measure and a graduated portion length of about 125mm. Next introduce to 25ml of distilled water into the measuring cylinder, further vigorously shaken with the mixture in every 10 minutes for 1-2 hour. At room temperature, allow stand the mixture to settle for 3 hours. Measure the volume occupied by the plant material, including any adhesive phytoconstituents contain mucilage, in millilitres. Calculate the mean value per gram of plant material [22] . **Result discussed table on 03.**

D. Loss on drying:

Outlined the method in the BP/EP and USP involves to evaluate weight loss in samples powdered drug primarily due to moisture, with also contributing other volatile substances. By direct drying on hot air oven at 100–105°C until observed constant weight is suitable for plant materials with minimal or less water content. The bottle and the contents are then weighed. The procedure was continued until a constant weight comes [23]. **Result discussed table on 03.**

2.03 Phytochemical studies of *Strebulus asper* leaves:

i. **Drying and grinding:**

Journal of Chemical Health Risks

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JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

Despite harvested of *Strebulus asper* plant material was at room temperature air-dried in the shade before being ground to a coarse powder using a mixer grinder and sieved through a 40-mesh sieve [24].

ii. **Preparation of extract by Solvent Extraction:**

Until a coarse powder was obtained the dried Strebulus asper leaf part were pulverized in the shade dry. Despite approximately 800 grams of above coarse dry powder was then further mate to extraction using a mixture of different ratio of ethanol and water (51:49) through continuous hot percolation (maintained at 30-45°C) utilizing a Soxhlet apparatus. For a duration of 72 hours the extraction process was continue carried out. Subsequently, the extract (hydroalcoholic) was filtered using filter paper and concentrated to obtained yield a dry mass through rota evaporator, resulting in a obtained green waxy residue. This residue (green waxy) was further continued to pull out any endure solvent by adding of triple distilled water and next evaporating more at least once, after that a solvent-free extract obtaining [24].

Fig 02: Hot Soxhlet Extraction of Strebulus asper leaf powdered drug.

iii. **Qualitative Hydroalcoholic extract of *Strebulus asper* Phytochemical analysis:**

A. Test for carbohydrates: [25,26]

The chemical analysis for carbohydrates in the dried powder and extracts of Solanum indicum fruits involved several procedures as detailed below, with results duly recorded.

Molisch's Test: The Hydroalcoholic extracts were fuse with Molisch's solution inflowed by the supplemental of concentrated sulphuric acid solution. presence of carbohydrates due to the expansion of a purple colour indicated the.

Benedict's Test: Hydroalcoholic extracts of *Strebulus asper* conducted filtrate was towards with Benedict's solution and applied gently heated. Formation orange precipitate signified the presence of carbohydrates sample.

Fehling's Test: The filtrate was portion of subjected to Fehling's solution I and II, and heating applied. Despite brick-red colour observation indicated the presence of reducing sugars or carbohydrates.

B. Test for alkaloids: [27]

The assessment for alkaloids in the extracts involved several methods outlined below, with observations noted.

Dragendorff's Test: The liquid solution (filtrate) was mixed with Dragendorff's solution, and a reddish-brown colour change indicated the presence of alkaloids.

Mayer's Test: The acidic liquid solution (filtrate) was mixed with Mayer's solution, forming a yellowish solid (precipitate) which showed the presence of alkaloids.

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

Wagner's Test: Adding Wagner's solution to the liquid solution (filtrate) resulted in a reddish color, confirming the presence of alkaloids.

Hager's Test: Treating the liquid solutions (filtrates) with Hager's solution and observing a yellow solid (precipitate) confirmed the presence of alkaloids.

C. **Detection of glycosides:** [26,28]

Various tests were conducted to detect glycosides in the extracts, as elaborated below, with results documented.

Modified Bontrager's Test: After breaking down the samples (hydrolysed extracts), ferric chloride solution and benzene were added. If the mixture turned a rose pink or red colour, it suggested the presence of glycosides.

Test for cardiac glycosides: The water-based extract (aqueous extract) went through several steps, eventually leading to a blue-green and red-brown colour change. This indicated the presence of cardiac glycosides.

Legal Test: Treating samples (extracts) with sodium nitroprusside, pyridine, and sodium hydroxide resulted in a pink to red colour, confirming the presence of cardiac glycosides.

D. **Test for phytosterols**:[29,30]

The assessment for phytosterols involved two distinct methods as described below, with outcomes recorded.

Libermann-Burchard Test: The plant extract, dissolved in chloroform, was treated with acetic anhydride and then concentrated sulfuric acid. If a brown ring formed at the junction of the liquids, it suggested the presence of phytosterols.

Salkowski's Test: The extract was mixed with chloroform and then shaken with concentrated sulfuric acid. A reddish-brown precipitate forming in the mixture indicated the presence of the steroid ring structure.

E. Test for flavonoids:[28,30]

The detection of flavonoids in the extracts was carried out using the following methods, with respective Colour changes noted.

Shinoda's Test: When the plant extract was mixed with magnesium and strong hydrochloric acid, it turned pink, red, or sometimes even green or blue. This suggests the presence of flavonoids.

Alkaline Reagent Test: Treating the extract with sodium hydroxide solution caused it to turn yellow. However, adding a weak acid made the yellow colour disappear. This change in colour indicates the presence of flavonoids.

F. Test for saponins: [31,32]

Saponin presence was evaluated through the following tests, with observable results noted.

Froth Test: Dissolution of extracts in water and subsequent shaking resulted in the formation of a foam layer, indicating the presence of saponins.

Foam Test: Direct mixing of extracts with water led to the formation and persistence of foam for 10 minutes, confirming the presence of saponins.

G. **Test for phenolic compounds**:[32]

Detection of phenolic compounds in the extracts involved multiple procedures as described below, with outcomes documented.

Gelatin Test: Adding gelatin solution to the extracts caused a precipitate to form, indicating the presence of phenolic compounds.

Ferric Chloride Test: Mixing extracts with ferric chloride solution turned the mixture green or blue, suggesting the presence of phenolic compounds.

Iodine Test: When fruit extracts were treated with iodine solution, a red colour appeared, indicating the presence of tannins.

Nitric Acid Test: Dissolving extracts in nitric acid caused them to turn reddish or yellowish, suggesting the presence of phenolic compounds.

H. Test for proteins and free amino acids:[30,31,33]

The presence of proteins and free amino acids was determined through the following methods, with respective Colour changes noted.

Millon Test: Mixing of extracts with Millon’s reagent resulted in the formation of a brick-red Colour upon heating, indicating the presence of proteins.

Biuret Test: Treatment of fruit extracts with sodium hydroxide solution and subsequent addition of copper sulphate led to the formation of a purple-violet Colour, confirming the presence of amino acids.

Ninhydrin Test: Addition of ninhydrin solution to extracts followed by boiling resulted in the formation of a blue Colour, indicating the presence of proteins and amino acids.

All qualitative Strebulus asper preliminary presence of Phyto-secondary metabolites is discussed in Table number 04.

2.04 Pharmacological learning of Antipyretic activity:

i. Animal Ethics:

Journal of Chemical Health Risks

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JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

The experimental protocol was approved by institutional Animal Ethics committee, by registration number of **1339/PO/Re/S/10/CPCSEA.**

ii. Experimental Method:[34]

Materials :

(a) Male albino rats.
(b) Clinical Rectal Thermometer.
(c) Hydroalcoholic extract
(d) Gastric tube.
(e) Disposable syringe.
(f) Sodium lauryl sulphate 0.5% w/v solution.
(g) Paracetamol.
(h) Dried yeast.

Screening of Strebulus leaves hydroalcoholic extract in Albino Rats:[35,36,37]

In a study aiming to evaluate the antipyretic effect of a test extract, fever was induced in rats by injecting a 15% brewer's yeast suspension. Four groups of Wistar rats received either saline (control), standard drug (paracetamol), or different doses of the test extract (200 mg/kg and 400 mg/kg) after fever development (18 hours post-injection). Rectal temperatures were measured before treatment (0 hour) and again at 4-hour intervals (4, 8, 12, and 18 hours) following drug administration.

Result was discussed in Table no 05.

3.0 Results & Discussion:

3.01 Morphological description:

Typically leaves are opposite and are either ovate or ovate-elliptic, and measure roughly 3–5 centimetres. They feature smooth (globous) surfaces, and appear glossy with a vibrant green above and bluish-grey (glaucous) and somewhat waxy below, with rounded or pointed tips. Stalks (petioles) range from 5 to 15 centimetres and are 'groomed,' meaning they are adorned with fine hair-like structures. Notable vein patterns include distinctly reticulate arrangements.

3.02 Microscopy:

LAMINA:

The uppermost layer of the leaf is referred to as the lamina or the upper epidermis. It is composed of a single layer of polygonal cells covered with a thin cuticle. It contains stomata, specialized pores that allow for gas exchange. These occur in the paracytic form, i.e. two guard cells occur with subsidiary cells and the stomatal pore is surrounded by these cells. The cells are evenly spread out throughout the layer.

MESOPHYLL:

The mesophyll of the leaf is of two types, the upper palisade layer and the spongy parenchyma. The upper palisade layer is with 2-3 layers of elongated, compactly arranged parenchymatous cells which are not continuous over the midrib. The spongy parenchyma is with numerous layers of loosely arranged parenchymatous cells with large intercellular spaces. These cells also have sphaeraphides, prismatic crystals and a few small vascular bundles with transfusion tissue.

LOWER EPIDERMIS: The lower epidermis of the leaf is similar to the upper epidermis in one layer of the perpendicularly elongated polygonal cells however, the lower epidermis bears more stomata than the upper epidermis.

MIDRIB: The midrib of the leaf is made up of several layers of tissues. The epidermal layer of the lamina is extended over the midrib region and collenchyma strips of 1-2 layers occurs above the lower epidermis. This is succeeded by cortical parenchyma that possesses some areas of calcium oxalate and prism and simple starch grains. The next cortical region of the midrib have bilateral vascular bundles.

VASCULAR BUNDLE: The vascular bundles of the leaf are made up of lignified xylem towards the dorsal surface and non lignified phloem towards the ventral surface.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

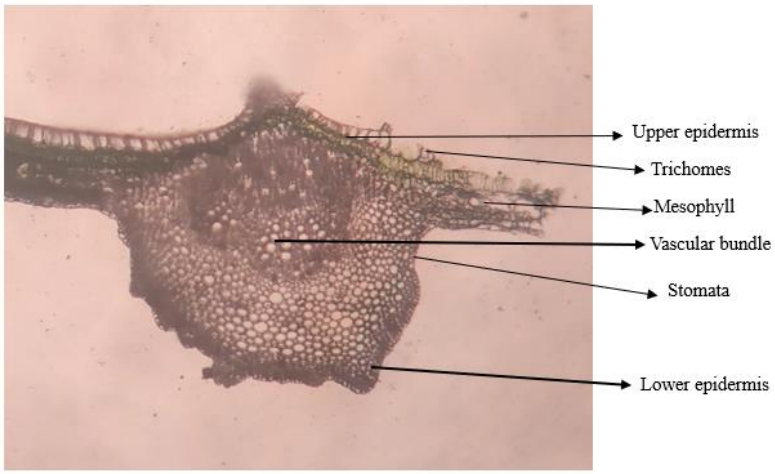

Fig.02- Transverse section of *Strebulus asper* leaf.

3.03 Quantitative microscopy:

Table no 01: *Strebulus asper* leaf Vein islet number, vein termination and stomatal index value :

Sl no	Vein islet number	Vein termination number	Stomatal index	
1	20.25	21.63	**Upper epidermis range**	**Lower epidermis range**
2	19.85	22.23	Minimum 9.36	Minimum 10.27
3	18.96	21.52		
4	18.52	23.69	Maximum 13.81	Maximum 12.09
5	21.26	21.95		
Total	98.84	111.02	Average 11.58	Average 11.18
Average	19.78	22.20		

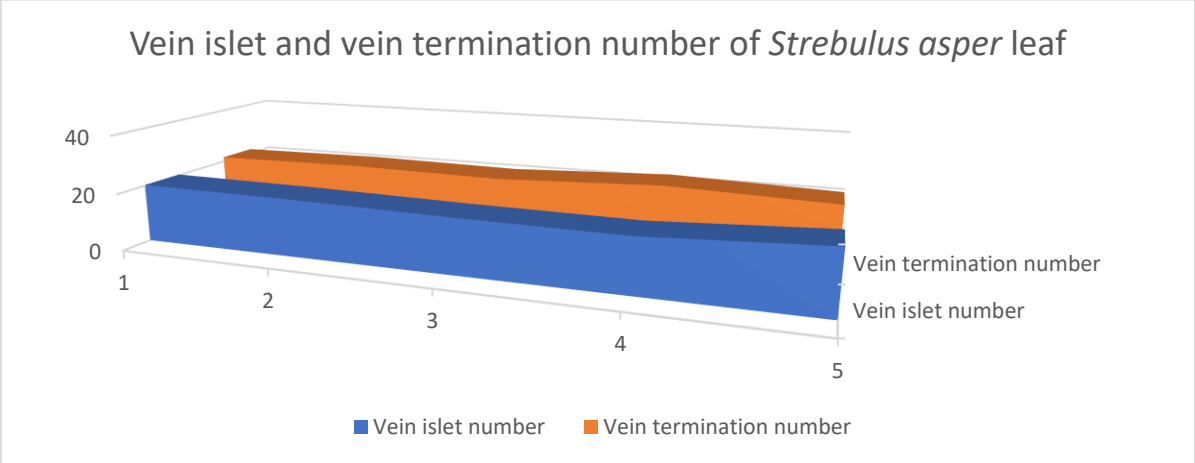

Fig 03: Graphical represent of vein islet and vein termination number

3.04 Powder *Strebulus asper* fluorescence Analysis result: Table no 02

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

REAGENT	UV ANALYSIS
Drug + Methanol	Light green
Drug + 5% NaOH	Light green
Drug + Glacial acetic acid	Cloud green
Drug + Ethanol	Fluorescent green
Drug + Pet ether	Colourless
Drug + Chloroform	Greyish green
Drug+ Conc. Sulfuric acid	Deep green
Drug+ 5% Ferric chloride	Dark green
Drug + 5% Potassium hydroxide	Fluorescent light green
Drug + Picric acid	Cream green
Drug + Ammonia solution	Light green
Drug + Cocn. HCl	Deep green

3.05 Physical studies of Strebulus asper value: Table no 03

Sl. No.	Parameter	Values (%)(w/w)
1.	Moisture Content	7.2%
2.	**Ash Values**	
	A. Total Ash	11.7%
	B. Water soluble ash	5.1%
	C. Acid insoluble ash	4.4%
	D. Sulphated ash	3.2%
3.	**Extractive Values**	
	Water soluble extractive	12.58%
	Ethanol soluble extractive	15.97%
	Methanol soluble extractive	9.87%
	Chloroform soluble extractive	6.12%
	Benzene soluble extractive	10.52%
	Ethyl Acetate soluble extractive	7.69%
	Petroleum Ether soluble extractive	5.13%
	n-Hexane soluble extractive	4.27%
4.	Swelling Index	0.10

Journal of Chemical Health Risks

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JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

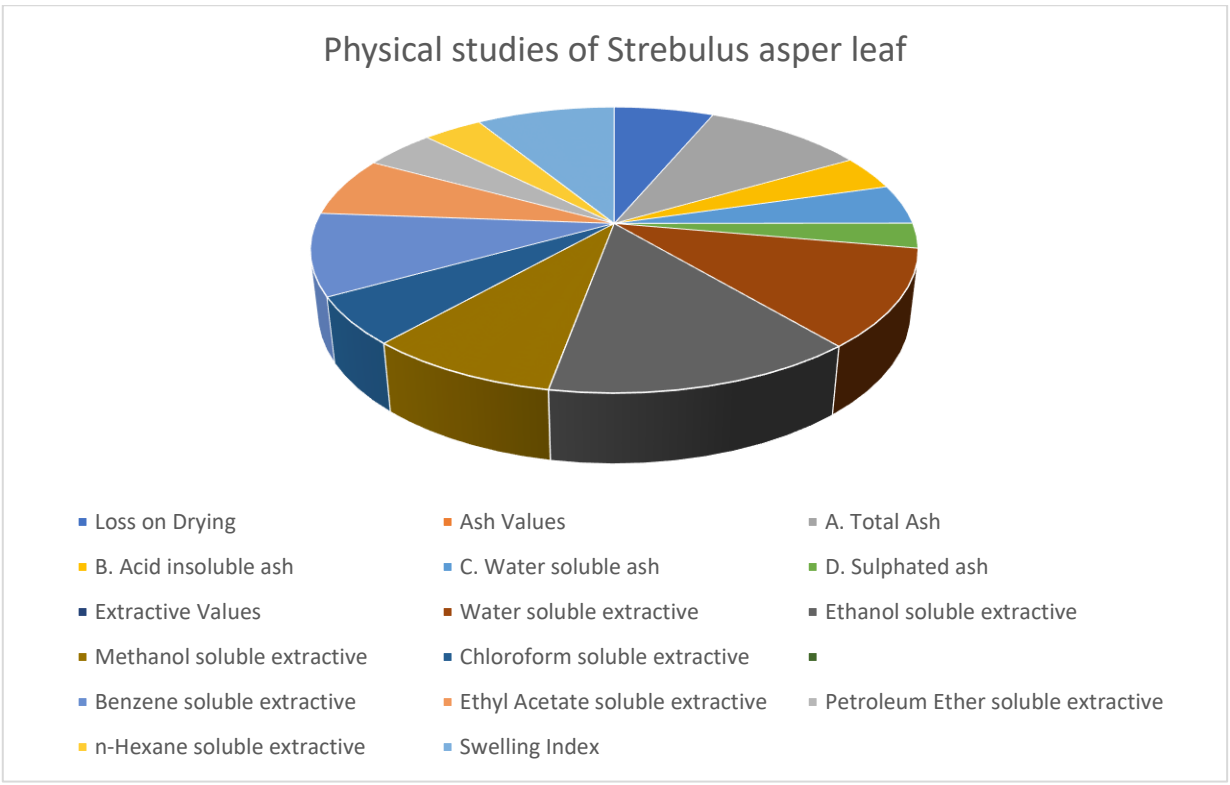

Fig no 04- Graphical represent of physical studies of powdered drug.

3.06 Qualitative Strebulus asper phytochemical screening:

Table no o4: Qualitatives metabolites presence result:

Plant Constituents Test/Reagent Used	Powdered Drug	Hydroalcoholic extract
TEST FOR CARBOHYDRATES		
Molisch's Test	+	+
Fehling's Test	-	+
Benedict's Test	+	+
TEST FOR PROTEINS & AMINO ACIDS		
Ninhydrin Test	+	+
Biuret Test	+	+
Millon's Test	+	+

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

TEST FOR ALKALOIDS		
Dragendroff's Test	+	+
Mayer's Test	+	+
Wagner's Test	+	+
Hager's Test	+	+
TEST FOR GLYCOSIDE		
Legal's Test	+	+
Modified Borntrager's Test.	+	+
Keller-Killiani's Test	+	+
TEST FOR PHYTOSTEROL		
Liebermann's test	+	+
Salkowski's test	+	+
Liebermann burchad's test	+	+
TEST FOR FLAVANOID		
Reaction with alkali	+	+
Shinoda's test	+	+
TEST FOR TANNINS & PHENOLIC COMPOUNDS		
5% $FeCl_3$ Solution	-	-
Reaction with gelatine	-	-
Reaction with Iodine	+	+

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(1), 2682-2696 | ISSN:2251-6727

Reaction with nitric acid	+	+
TEST FOR SAPONINS		
Foam	+	-
Froth	-	-

+ indicates presence and – indicates absent in preliminary phytochemical evaluation.

3.07 Anti-pyrectics estimation result in biological screening: Table no 05

Sl no	Treatment	Initial temperature	Rectal Temp. after Yeast induction				
			19h	20h	21h	22h	23h
1	Control	37.34±0.11	39.52 ± 0.18	39.47± 0.61	39.35± 0.14	39.30± 0.03	39.25± 0.06
2	Hydroalcoholic extracts(200mg/kg)	37.32±0.29	39.21± 0.11	38.39± 0.17 *	38.19± 0.17*	38.57± 0.42*	37.64± 0.03*
3	Hydroalcoholic extracts(400mg/kg)	37.37±0.59	39.13± 0.17*	36.77± 0.09*	36.49± 0.18*	37.74± 0.17*	37.35± 0.03*
4	Paracetamol (150 mg/ kg)	37.28±0.41	39.19± 0.15*	35.84± 0.13*	36.49± 0.22*	37.67± 0.20*	37.59± 0.07*

Mean ±SEM,"*" indicates p<0.05,**indicates p<0.01

The study evaluated the antipyretic activity of hydroalcoholic extracts from *Strebulus asper* leaf using the Brewer's yeast-induced pyrexia method. The extracts demonstrated a significant ($p \leq 0.05$) dose and time-dependent reduction in fever compared to the control and standard (paracetamol) groups. After yeast injection and treatment, rectal temperatures in the treated groups showed a marked decrease (38.39 ± 0.17 °C for 200mg/kg extract, 36.77 ± 0.09 °C for 400mg/kg extract, and 35.84 ± 0.13 °C for paracetamol at 20 hours). Each value represents the mean ± standard error of the mean (SEM) of six rats. The p-value was significant at ≤ 0.05.

Conclusion:

Comprehensive studies, including pharmacognostic, phytochemical, and pharmacological analyses, have revealed that *Streblus asper* Lour. (Moraceae) is a valuable source of cardiac glycosides. This plant demonstrates a broad spectrum of therapeutic benefits, including antipyretic. Interest in this plant stems from its abundance and its significant role in traditional medicine within the local community. Its documented use in historical remedy books and the Ayurvedic Pharmacopoeia underscores its longstanding reputation for healing properties.

References:

1. Rahman, E. T., Raihan, S. Z., Al Mahmud, Z., & Qais, N. (2014). Analgesic activity of methanol extract and its fractions of Streblus asper (Lour.) roots. *World Journal of Pharmaceutical Research3*, *4*, 18-24.
2. Pandey, M. M., & Rastogi, S. (2022). Streblus asper: A phytochemical, ethnopharmacological and pharmacological research update. *Journal of Pharmacognosy and Phytochemistry*, *11*(3), 07-18.

3. Subha, R., Dinesh K, K., & Ajay Kumar Singh, R. (2006). Streblus asper Lour.(Shakhotaka): a review of its chemical, pharmacological and ethnomedicinal properties. *Evidence-Based Complementary and Alternative Medicine*, *3*(2), 217-222.
4. https://www.ncbi.nlm.nih.gov/books/NBK562334/
5. Alamgir, A. N. M., Rahman, M., & Rahman, A. (2013). Phytochemical characteristics, antimitotic, cytotoxic and antitumor activities of bark extract of Streblus asper Lour. Bangladesh Journal of Botany, 42(1), 17-22.
6. Singsai, K., Charoongchit, P., Chaikaew, W., Boonma, N., Fhanjaksai, P., & Chaisatan, K. (2020). Antilipoxygenase and anti-inflammatory activities of Streblus asper leaf extract on xylene-induced ear edema in mice. *Advances in pharmacological and pharmaceutical sciences*, *2020*.
7. https://en.wikipedia.org/wiki/Streblus_asper.
8. https://www.jiwaji.edu/pdf/ecourse/pharmaceutical/Evaluation%20of%20crude%20drugs.pdf
9. Singh g.k, bhandari anil, the text book of Pharmacognosy, cbs publisher and distributors,1st edition, new delhi, bengaluru, chennai, kochi, kolkata, page no-32-33.
10. Shah biren, seth ak,text book of Pharmacognosy and phytochemistry,2nd edition, cbs publishers & distributors pvt ltd, new delhi,chenai, pune, 2014: 116
11. Tripathi, A. K., Surendra, T., & Verma, N. K. (2014). A study on pharmacognostic and chemomicroscopic features of Streblus asper L. Der Pharmacia Lettre, 6(5), 30-36.
12. Vasudevan, T.N. and Laddha, K.S.: Herbal Drug Microscopy, Yucca publishing House, Dowbivilli-421202, Maharastra, 1st Edn., March 2003, p.20.
13. Dhanabal SP, Suresh B, Sheeja E, Edwin E.2005, Indian J Nat Prod; 21(1):9-11.
14. https://www.ipc.gov.in/images/General_Chapter_on_Microscopic_Evaluation_of_Herbs_and_Processed_Herbs.pdf
15. Murti, Y., Yogi, B., & Pathak, D. (2010). Pharmacognostic standardization of leaves of Calotropis procera (Ait.) R. Br. (Asclepiadaceae). International journal of Ayurveda research, 1(1), 14–17. https://doi.org/10.4103/0974-7788.59938
16. Dr. Mukharjee, P.K.: Quality Control of Herbal Drugs, Business Horizons Pharmaceutical Publishers, G-59, Masjid Moth, GK-2, New Delhi-110048, 2nd Reprint Edn. 2007, pp. 356-357.
17. Chatterjee, M. S., Khawas, M. S., Kumari, S., & Satpathy, K. R. Pharmacognostical Exploration And Pharmacological Potential Of Solanum Indicum Berries Belongs To The Family Solanaceae.
18. Pharmacopoeia of India 1996, The Controller of Publication, Civil Lines, Delhi-110054, Vol-II, p. A-54.
19. Bhar K, Mondal S(2022). Proponents Implemented for Quality Standardization and Toxicity Evaluation of Classical Ayurvedic Formulation: Dhatupaushtik Churna. Current Overview on Pharmaceutical Science Vol. 1. Dec 24:163-209.
20. The ayurvedic pharmacopoeia of india part - ii (formulations) volume - iii first edition,2010: 144.
21. Quality control methods for medicinal plant, who guidelines, geneva. 1998; preface 4-17.
22. https://www.ipc.gov.in/images/General_chapter_on_pharmacognosy_Revised_IP_format.pdf
23. Trease and evans. Text book of Pharmacognosy. 16th edition. 2009; 121-123
24. Kokate, C.K., Purohit, A.P. & Gokhale, S.B. : Pharmacognosy, Nirali Prakashan, 41 Budhwar Peth, Jogeshwari Mandir Lane, Pune-411002, 35th Edn. 2006, pp. 105-108.
25. Auwal, M. S., Saka, S., Mairiga, I. A., Sanda, K. A., Shuaibu, A., & Ibrahim, A. (2014). Preliminary phytochemical and elemental analysis of aqueous and fractionated pod extracts of Acacia nilotica (Thorn mimosa). In Veterinary research forum: an international quarterly journal (Vol. 5, No. 2, p. 95). Faculty of Veterinary Medicine, Urmia University, Urmia, Iran.
26. Kokate, C.K., Purohit, A.P. & Gokhale, S.B.: Pharmacognosy, Nirali Prakashan, 41 Budhwar Peth, Jogeshwari Mandir Lane, Pune-411002, 35th Edn. 2006, pp. 593-597.
27. Kumar, A., Jha, K. K., Kumar, D., Agrawal, A., & Gupta, A. (2012). Preliminary phytochemical analysis of leaf and bark (mixture) extract of Ficus infectoria plant. The pharma innovation, 1(5, Part A), 71.
28. Dr.Ansari, S.H.: Essentials of Pharmacognosy, Birla Publication Pvt. Ltd., Shahdora, Delhi-110032, 1st Edn. 2005-2006, pp. 588-590.
29. Shaikh, J. R., & Patil, M. (2020). Qualitative tests for preliminary phytochemical screening: An

overview. International Journal of Chemical Studies, 8(2), 603-608.

30. Shaikh, J. R., & Patil, M. (2020). Qualitative tests for preliminary phytochemical screening: An overview. International Journal of Chemical Studies, 8(2), 603-608.
31. María, R., Shirley, M., Xavier, C., Jaime, S., David, V., Rosa, S., & Jodie, D. (2018). Preliminary phytochemical screening, total phenolic content and antibacterial activity of thirteen native species from Guayas province Ecuador. Journal of King Saud University-Science, 30(4), 500-505.
32. Yadav, M., Chatterji, S., Gupta, S. K., & Watal, G. (2014). Preliminary phytochemical screening of six medicinal plants used in traditional medicine. Int J Pharm Pharm Sci, 6(5), 539-42.
33. Tadesse, S., Ganesan, K., Nair, S. K. P., Letha, N., & Gani, S. B. (2016). Preliminary phytochemical screening of different solvent extracts of leaves and stems of Commelina benghalensis L.(Family: Commelinaceae). Int. J. Pharm. Chem. Biol. Sci, 6, 103-107.
34. Arunachalam, L. G., Rajendran, K., Mandal, A. B., & Bhattacharya, S. K. (2005). Antipyretic activity of Alstonia macrophylla Wall ex A. DC: An ethnomedicine of Andaman Islands. Pharm Pharm Sci, 8, 558-564.
35. Luo, C. HE, M. L., & Bohlin, L. (2005). Is COX-2 a perpetrator or a protector? Selective COX-2 inhibitors remain controversial 1. Acta Pharmacologica Sinica, 26(8), 926-933.
36. Guyton, A. C. (2006). Text book of medical physiology. China.
37. Shah biren, seth ak,text book of Pharmacognosy and phytochemistry,2nd edition, cbs publishers & distributors pvt ltd, new delhi,chenai, pune, 2014: 138