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Pharmacognostical, Phyto Chemical, and Analgesic Activity of Hydroalcohlic Extract Of Streblus Asper Leaves

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ABSTRACT
The hydroalcoholic extract from the leaves of Streblus asper(S. asper), a plant that is highly valued in many traditional medical systems, is the subject of this study's pharmacognostic studies.Research on the pharmacological characteristics of the extract is aimed at revealing its therapeutic potential.An important analgesic effect was shown in the animal model by the hydroalcoholic extract of the leaves of S. asper.The leaves of S. asper (Family : Moraceae),A widely accessible medicinal herb from Bangladeshhas been studied to see whether it has any analgesic effect through a peripheral mechanism of pain relief.At room temperature,distilled water and ethanol were used to extract the powdered leaves,which were than stored in desicator.Diclofenac sodium fraction of doses 400 mg/kg and 200 mg/kg body weight induced in the screening process for its analgesic activity.The hydroalcohlic extract also induced significant reduction in pain.The leaves of S. aspermay be a possible lead intended to relieve pain.Overall, this research adds to our understanding of traditional medicinal plants and emphasizes the value of using natural resources to create cutting-edge pharmaceutical treatments.

Keywords: S. asper,Pharmacognostical,Phytochemical,Analgesic activity,Albino rats.

I. INTRODUCTION

Nature always stands as a golden work to exemplify the outstanding phenomenon of symbiosis.From time immemorial man is inevitably associated with plants living in the remote forest areas, the prehistoric man looked upon and invariably used the plant material available at hand for multifarious uses in general and for the alleviation of ailments in particular.The plants are to man for his life.The three important necessities of life-food,clothing and shelter and host of other useful product are supplied to him by the plant kingdom.The famous folk plant Streblus asper lour,which is a member of the Moraceae family,is mostly found in tropical and subtropical areas of Asia.Since ancient times, S.asper has been utilized in traditional Indian medicine. It's acknowledged in numerous pharmacopoeia, including Ayurvedic pharmacopoeia and medicinal plant monographs.

Botanical name : Streblus asper
Streblus asper Lour is a small tree found in tropical countries, such as India, Sri Lanka, Malaysia, the Philippines and Thailand.

Table-1 Taxonomical classification:

Kingdom :	Plantae
Subkingdom:	Tracheobionta
Division :	Magnoliophyta
Class :	Magnoliopsida
Order :	Urticales
Family :	Moraceae
Genus :	Streblus
Species :	S.asper

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Vernacular names:

- English : Sand paper mulberry
- Hindi : Sahora
- Sanskrit : Sakhotaka
- Bengali : Sheoda
- Odia : Sahada
- Telegu : Baranki
- Marathi : Sahod
- Gujarati : Sahoda

Geographical distribution and habitat: Streblus asper, commonly known as the siamese rough bush, is native to Southeast Asia and found in diverse habitats including dry forests, riverbanks, and disturbed areas. This species thrives in tropical climates with well-drained soils, often growing alongside other trees such as dipterocarps. Its geographical distribution spans from India through Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, and the Philippines. Streblus asper typically reaches heights of 10-20 meters, with a rough, grey bark and elliptical leaves. Its dense wood and fibrous bark are utilized in traditional medicine and handicrafts, contributing to its ecological and cultural significance in the region.

Habitat:By Originating from an arid landscapeacross various countries such asIndonesia, Cambodia, Thailand, India, Sri Lanka, Malaysia, and Vietnam, this atreewith moderate-sized flourishes primarily found in the subtropical zones of India, time. remarkable habitatresilience to a widelyrange of soil compositions and properties.

Ethnomedical use:

1. Streblus asper, commonly known as the siamese rough bush, is utilized in ethnomedicine across various cultures.
2. It holds significance in traditional medicine for treating conditions like diabetes, inflammation, and microbial infections.
3. Scientific research highlights its bioactive compounds such as flavonoids and tannins, which exhibit antioxidant, antimicrobial, and anti-inflammatory properties.
4. Studies suggest potential therapeutic applications in managing chronic diseases due to its diverse pharmacological activities.
5. Streblus asper exemplifies the intersection of traditional knowledge and modern scientific inquiry in ethnomedicinal practices.

Figure 1 : Streblus asper plant leave

Macroscopy:

The macroscopical study of Streblus asper involves examining its physical characteristics visible to the naked eye.Tree Morphology: Streblus asper is a small to medium-sized tree, often reaching heights of 10-15 meters. It has a dense crown with spreading branches.The leaves are alternate, simple, ovate to elliptic in shape, with entire margins. They are dark green on the upper surface and lighter green on the underside.The venation is prominent, with pinnate veins and a prominent midrib.The leaves may have a characteristic odor.Crude drug may be classified into organized and unorganized drugs.

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Microscopy:
In the microscopy of midrib,we found the following characters

1. Lamina
2. Mesophyll
3. Lower epidermis
4. Vascular bundle

Lamina:

The term "lamina" refers to the topmost layer of the leaf.It consists of a single layer of cuticle-covered polygonal cells.Stomata, specialized pores that enable gas exchange, are present in it.

Mesophyll:

There are two different types of mesophyll in leaves: the spongy parenchyma and the upper palisade layer.The top palisade layer is made up of firmly placed longitudinal parenchymatous cells arranged in two or three layers.These cells also have sphaeraphides,prismatic crystals and few vascular bundles.

Lower epidermis:

Lower epidermis have perpendicularly elongated polygonal cells and its bear more stomata than the upper epidermis.

Vascular Bundles:

The lamina's epidermal layer extends over the midrib region, and 1-2 layer-long colenchyma strips are found above the lower epidermis.This is accomplished by the cortical parenchyma, which has some regions with calcium oxalate, prism, and simple starch grain.

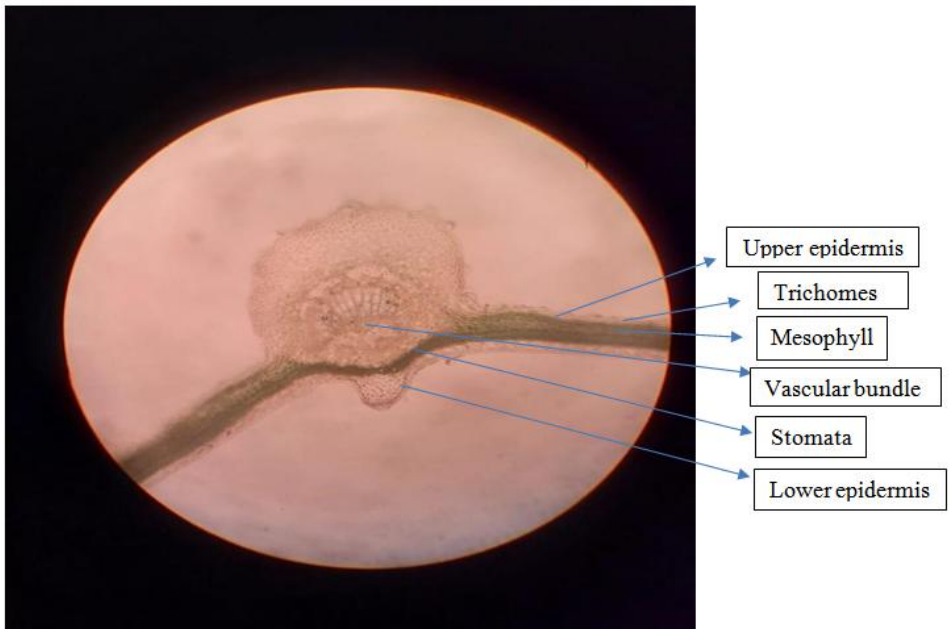

Fig2:Transverse section of Strebulus asper leafmidrib

Table-2 Evaluation of physical parameters ofStrebulus asper leaf:

Sl no	Parameters	Percentage(% w/w)
1	**Ash Values**	
	A. Total Ash	11.7%
	B. Water soluble ash	5.1%
	C. Acid insoluble ash	4.4%
	D. Sulphated ash	3.2%
2	Moisture Content	7.2%

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3	Swelling Index	0.10%
4	**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%
	Petrolium ether soluble extractive	5.13%
	n Hexane soluble extractive	4.27%

Table-3 Qualitative phytochemical screening ofStrebulus asper leaf:

Plant constituents Test	**Powdered Drug**	**Hydroalcohlic extract**
Test for Proteins and Amino acids		
Ninhydrin Test	+	+
Biuret Test	+	+
Millon's Test	+	+
Dragendroff's Test	+	+
Mayer's Test	+	+
Wagner's Test	+	+
Hager's Test	+	+
Test for Carbohydrates		
Molish's Test	+	+
Fehling's Test	-	+
Benedict's Test	+	+
Test for Glycoside		
Legal's Test	+	+
Modified Borntrager's Test	+	+
Keller-Killiani Test	+	+
Test for Phytosterol		
Liebermann's Test	+	+
Salkowski's Test	+	+
Libermann burchad's Test	+	+
Test for Flavonoid		
Reaction with alkali	+	+
Shinoda	+	+
Test for Tannins & Phenolic compounds		
5% $Fecl_3$ Solution	-	-
Reaction with Gelatine	-	-
Reaction with Iodine	+	+
Test for Saponins		
Foam	+	-
Froth	-	-

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Pharmacological Potential:

According to the traditional medical system, there are certain plants that can reduce inflammation and pain.In the current study plant S asper is used for the study as well as ethnomedicinal use.The study is evaluated as analgesic activity of hydroalcohlic extracts ofS.asper.The extracts demonstated a significant time and dose dependent,compared to the control and standard groups. This plant demonstrates a broad spectrum of pharmacological therapeutic benefits including analgesic. Acetic acid causes an increase in peritoneal fluids of Prostaglandin E2 PGE2 and Prostaglandin F2 α PGF2 α , serotonin, and histamine, which are a model commonly used for screening peripheral analgesics . With respect to the acetic acid-induced abdominal writhing which is the visceral pain model.Thus, the 200 mg/kg and 400 mg/kg hydro-alcoholic extract of S. asperhadnotable ($p<0.05$) analgesic effect in cases where the reference medication diclofenacdemonstrated the strongest analgesic effect at 100 mg/kg.Acetic acid generally releases endogenous substances that cause pain. Such as serotonin, bradykinins, histamine, PGs, and substance P.Additionally, the technique has been linked to prostanoids generally,that is, elevated PGE2 levelsPGF2α in peritoneal secretions, as well asproduct of lipoxygenase.Lowering the acetic acid-induced, the writhing of S. asper suggests that the analgesic effect may only be slightlymediated by preventing the synthesis and release of PGs and other endogenous compounds.

Table-4 Analgesiceffectofhydroalcohlic extract of S.asper

Sl no	Treatment	Reaction time (second)					
		0 min	30 min	60 min	120 min	180 min	240 min
1	Control	2.3±0.14	2.7±0.96	2.5±0.21	2.2±0.07	2.8±0.35	3.0±0.08
2	Diclofenac sodium (100 mg/kg)	2.7±0.32	3.6±0.35	4.6±0.39	4.5±0.45	4.32±0.23	4.15±0.7
3	Hydroalcohlic extract(200 mg/kg)	2.30±0.5	2.32±0.8	2.81±0.12	2.84±0.07*	2.86±0.13	2.87±0.15
4	Hydroalcohlic extract(400 mg/kg)	2.34±0.7	2.40±0.11	2.91±0.15*	2.90±0.09*	2.93±0.17	2.96±0.21

Mean ± SEM, "*" indicates $p<0.05$

II. CONCLUSION:

According to both macroscopic and microscopic analyses, leaves are a good sink for a variety of metabolites and bioactive molecules.Even in the plant drug's powdered form, these results may be helpful in enhancing the body of knowledge already available on the identification and standardization of Streblus asper and differentiating it from adulterants and substitutes.The results of these studies also indicated the importance of the observed phytochemical and pharmacognostic parameters for formulation development and quality control.This research includes pharmacognostic, phytochemical, and pharmacological analyses.Results shows hydro-alcoholic extract of S. asper had notable ($p<0.05$) analgesic effect as compared to Diclofenac sodium.

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