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Pharmacognostical and Phytochemical Evaluation of *Entada rheedei* Spreng: Validation of a Folklore Medicinal Plant Used in Amavata

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ABSTRACT

Background: *Entada rheedei* Spreng. is a folklore medicinal plant traditionally used in the coastal regions of Karnataka for the treatment of Amavata (Rheumatoid Arthritis). Despite extensive traditional use, scientific validation regarding its pharmacognostical and phytochemical properties remains limited.

Objective: The present study was undertaken to evaluate the pharmacognostical and phytochemical characteristics of *Entada rheedei* Spreng. seeds and to validate its traditional therapeutic application in Amavata.

Materials and Methods: Seeds of *Entada rheedei* were collected from the Western Ghats region of Karnataka and subjected to detailed pharmacognostical evaluation including macroscopic, microscopic, powder microscopy, physicochemical, and phytochemical analyses. Standard laboratory procedures were employed for determination of moisture content, ash values, extractive values, and phytochemical screening. HPTLC analysis was also performed to identify major phytoconstituents.

Results: Pharmacognostical analysis revealed characteristic morphological and microscopic features including thick seed coat, sclereids, lignified fibers, starch grains, and oil globules. Physicochemical evaluation demonstrated acceptable ash and moisture values. Preliminary phytochemical screening showed the presence of alkaloids, saponins, flavonoids, tannins, carbohydrates, and fixed oils. HPTLC fingerprinting produced distinct peaks at UV 254 nm and 366 nm indicating the presence of multiple bioactive compounds.

Conclusion: The findings of the present study scientifically validate the traditional use of *Entada rheedei* Spreng. in Amavata. The plant possesses significant pharmacognostical and phytochemical properties which may contribute to its anti-inflammatory and analgesic effects. Further pharmacological and clinical studies are recommended for isolation and characterization of active constituents.

Keywords: *Entada rheedei* Spreng; Pharmacognosy; Phytochemistry; Amavata; Rheumatoid Arthritis; Folklore Medicine

INTRODUCTION

Medicinal plants continue to serve as an important source of therapeutic agents in traditional healthcare systems. Ayurveda and folklore medicine have long utilized plant-based remedies for the management of inflammatory and degenerative diseases. Among these, *Entada rheedei* Spreng., belonging to the family Fabaceae, is a large woody climber commonly distributed in tropical and subtropical regions including India, Sri Lanka, China, and Southeast Asia.

The plant is locally known as “Pallekai” in coastal Karnataka and has been traditionally employed by folklore practitioners for the treatment of joint pain, swelling, stiffness, and inflammatory disorders corresponding clinically to Amavata. In Ayurveda, Amavata is characterized by the vitiation of Ama and Vata leading to joint pain, swelling, stiffness, fever, and restricted movement.

Although the folklore use of *Entada rheedei* is widespread, scientific evidence validating its medicinal efficacy is scarce. Therefore, the present study was undertaken to evaluate the pharmacognostical and phytochemical properties of *Entada rheedei* seeds to establish quality standards and support its traditional therapeutic claims.

MATERIALS AND METHODS

Collection and Authentication of Plant Material

Fresh seeds of *Entada rheedei* Spreng. were collected from the foothills of the Western Ghats in Dakshina Kannada district, Karnataka, India. The plant material was authenticated based on macroscopic and taxonomical characteristics.

Pharmacognostical Evaluation

Macroscopic Evaluation

The seeds were dark brown to black, circular, flattened, and woody in appearance. The pods were large and segmented with multiple seeds arranged linearly.

Table 1. Macroscopic Characteristics of *Entada rheedei* Seeds

Character	Observation
Colour	Dark brown to black
Shape	Circular and flattened
Surface	Smooth and hard
Odour	Characteristic
Taste	Kashaya
Texture	Woody and hard

Microscopic Evaluation

Microscopic examination of seed kernel powder revealed:

- Thick-walled sclereids
- Lignified fibers
- Starch grains
- Oil globules
- Parenchymatous cells

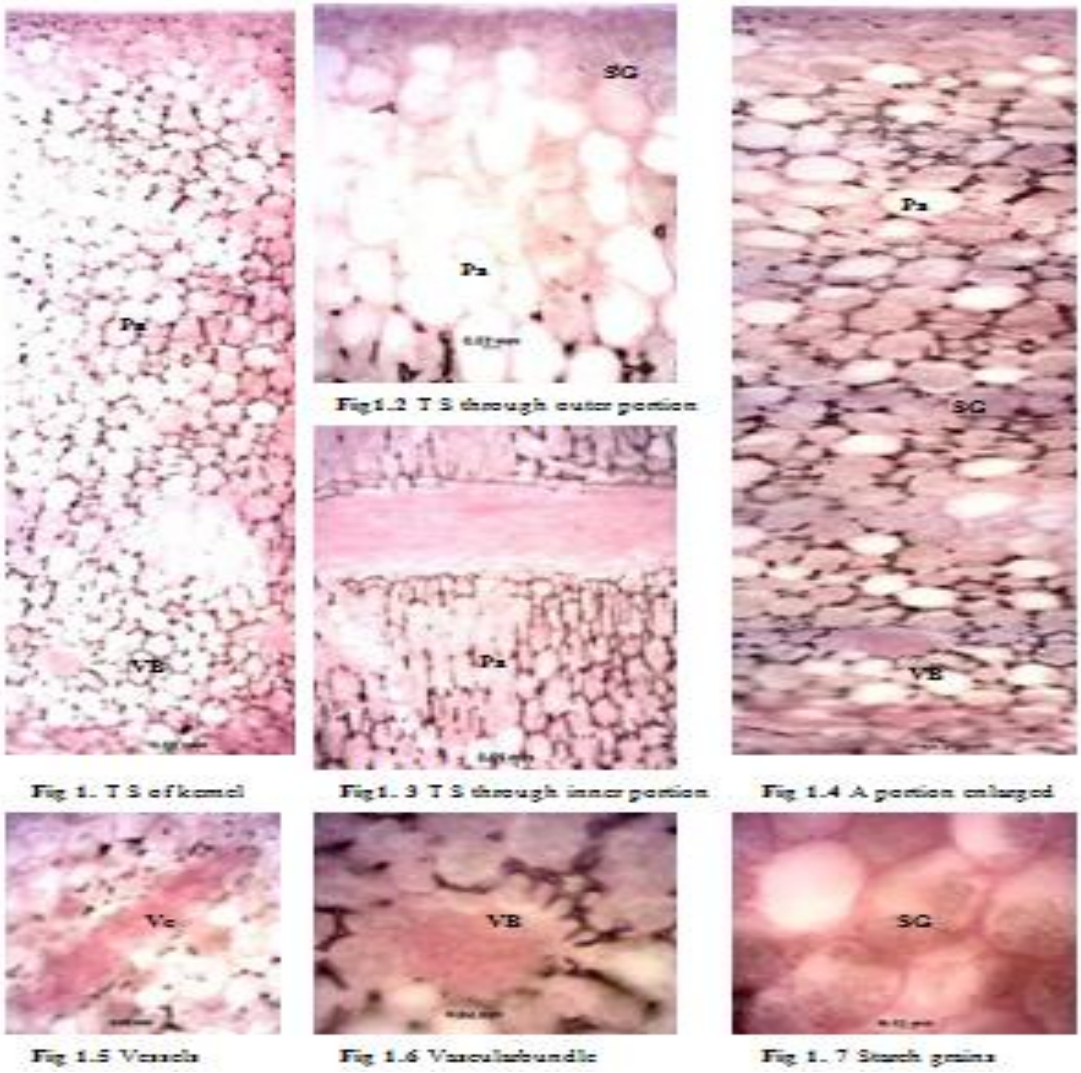

Fig 1. Microscopic Features of *Entada rheedei* Seed Kernel

Physicochemical Analysis
Physicochemical standards were established according to standard pharmacognostical procedures.

Table 2. Physicochemical Parameters of *Entada rheedei*

Parameter	Result
Moisture Content	5.2%
Total Ash	4.8%
Acid Insoluble Ash	1.2%
Water Soluble Ash	2.6%

The moisture content indicated good stability and lower microbial susceptibility of the crude drug.

Phytochemical Screening
Preliminary phytochemical screening was carried out using alcoholic extracts of seed powder.

Table 3. Phytochemical Constituents Detected in *Entada rheedei*

Phytoconstituent	Result
Alkaloids	Present
Saponins	Present
Tannins	Present
Flavonoids	Present
Carbohydrates	Present
Fixed Oils	Present
Glycosides	Trace

The phytochemical profile suggests possible anti-inflammatory and antioxidant activities of the plant.

HPTLC Fingerprinting

HPTLC analysis of alcoholic extract demonstrated multiple peaks under UV 254 nm and UV 366 nm confirming the presence of several bioactive constituents.

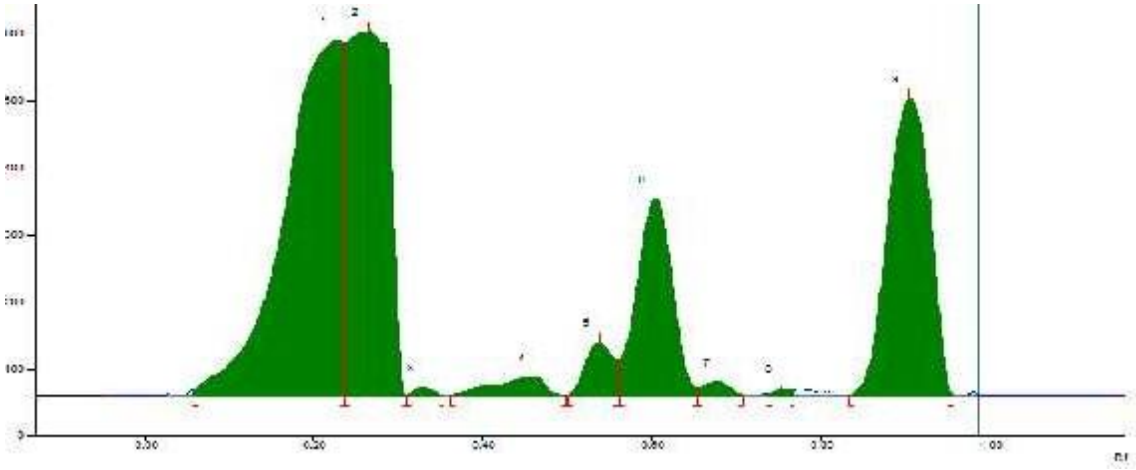

Fig 2. HPTLC Densitometric scan of alcohol extract of *Entada rheedei* Spreng.7µl at UV254 nm

Track 4, ID: Enteda

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.06 Rf	10.1 AU	0.23 Rf	531.3 AU	26.96 %	0.24 Rf	26.7 AU	26479.6 AU	35.33 %
2	0.24 Rf	526.7 AU	0.27 Rf	544.4 AU	27.62 %	0.31 Rf	1.8 AU	19483.8 AU	26.00 %
3	0.31 Rf	2.1 AU	0.33 Rf	12.9 AU	0.66 %	0.35 Rf	0.5 AU	212.7 AU	0.28 %
4	0.36 Rf	0.3 AU	0.46 Rf	28.7 AU	1.46 %	0.50 Rf	0.4 AU	1267.4 AU	1.69 %
5	0.50 Rf	0.8 AU	0.54 Rf	80.3 AU	4.07 %	0.56 Rf	53.0 AU	1908.7 AU	2.55 %
6	0.56 Rf	53.7 AU	0.60 Rf	295.3 AU	14.99 %	0.65 Rf	12.4 AU	8949.2 AU	11.94 %
7	0.66 Rf	12.6 AU	0.68 Rf	21.6 AU	1.10 %	0.71 Rf	1.5 AU	481.3 AU	0.64 %
8	0.74 Rf	3.1 AU	0.75 Rf	11.7 AU	0.60 %	0.77 Rf	8.8 AU	175.5 AU	0.23 %
9	0.84 Rf	0.5 AU	0.91 Rf	444.5 AU	22.55 %	0.96 Rf	0.4 AU	15983.9 AU	21.33 %

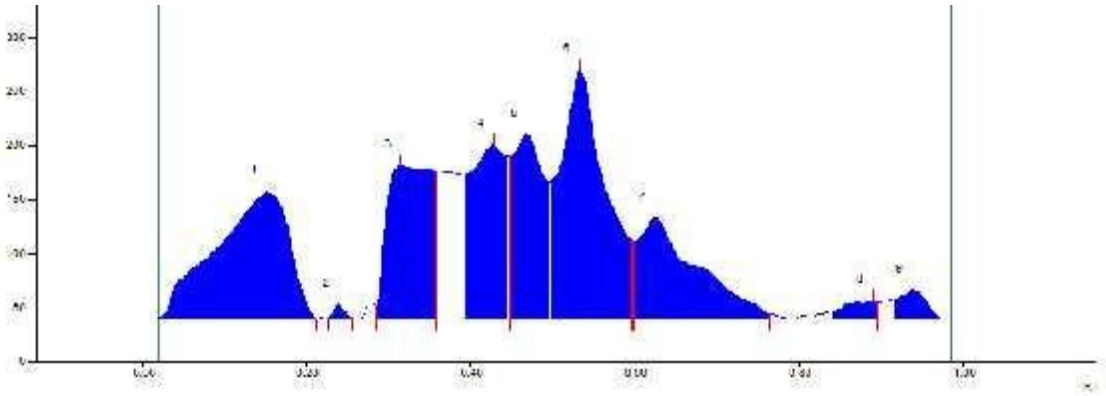

Fig 3. HPTLC Densitometric scan of alcohol extract of *Entada rheedei* Spreng.7µl at UV366 nm

Track 4, ID: Enteda

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.02 Rf	2.1 AU	0.15 Rf	117.3 AU	12.06 %	0.21 Rf	0.1 AU	7518.9 AU	19.90 %
2	0.23 Rf	2.0 AU	0.24 Rf	13.4 AU	1.38 %	0.26 Rf	1.1 AU	125.8 AU	0.33 %
3	0.29 Rf	12.0 AU	0.32 Rf	142.2 AU	14.62 %	0.36 Rf	37.2 AU	5514.1 AU	14.59 %
4	0.39 Rf	134.1 AU	0.43 Rf	161.3 AU	16.58 %	0.45 Rf	49.9 AU	4905.8 AU	12.98 %
5	0.45 Rf	150.6 AU	0.47 Rf	170.5 AU	17.53 %	0.50 Rf	26.7 AU	4714.4 AU	12.48 %
6	0.50 Rf	127.2 AU	0.53 Rf	231.0 AU	23.75 %	0.60 Rf	73.0 AU	9072.5 AU	24.01 %
7	0.60 Rf	71.2 AU	0.63 Rf	93.1 AU	9.57 %	0.76 Rf	4.4 AU	4834.3 AU	12.79 %
8	0.84 Rf	6.9 AU	0.89 Rf	17.5 AU	1.80 %	0.90 Rf	16.3 AU	486.4 AU	1.29 %
9	0.92 Rf	17.8 AU	0.94 Rf	26.4 AU	2.71 %	0.97 Rf	0.5 AU	617.4 AU	1.63 %

DISCUSSION

The pharmacognostical evaluation established distinctive diagnostic characteristics for identification and standardization of *Entada rheedei* seeds. The presence of sclereids, lignified fibers, starch grains, and oil globules serves as important microscopic markers.

Physicochemical parameters such as ash values and moisture content were within acceptable limits indicating purity and quality of the crude drug. Preliminary phytochemical studies confirmed the presence of alkaloids, flavonoids, tannins, saponins, and fixed oils which are known for anti-inflammatory and analgesic activities.

The traditional use of *Entada rheedei* in Amavata may be attributed to these bioactive constituents which potentially act by reducing inflammation, oxidative stress, and pain associated with rheumatoid conditions.

The HPTLC fingerprint profile generated in this study may serve as a reference standard for future quality control and standardization of the plant material.

CONCLUSION

The present pharmacognostical and phytochemical investigation scientifically validates the traditional use of *Entada rheedei* Spreng. in Amavata. The study established diagnostic pharmacognostical standards and confirmed the presence of several therapeutically important phytoconstituents. The findings support the folklore claim and provide a scientific basis for further pharmacological and clinical investigations.

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