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Physico-chemical, Phytochemical and Spectroscopic Characteristics of Aqueous and Methanolic Extracts of *Laportea interrupta* L. Chew Leaf.

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ABSTRACT

Human life is depending on plants for various needs including for food and medicine. The indigenous medicine system of every country is using plant and plant products as their basic material for preparation of medicine. *Laportea interrupta* L. Chew commonly known as 'stinging nettle' is one of the ethnomedicinal plants of India claimed for various medicinal uses like anti-inflammatory, anti-pyretic and antimicrobial agent. However, the plant has not been much explored for its chemical characteristics. The present study has carried out detailed Physico-chemical, Phytochemical and Spectroscopic Characteristics of aqueous and methanolic extracts of *Laportea interrupta* L. Leaf. Phytochemical study showed the presence of flavonoids, glycosides, saponins and alkaloids. The spectroscopic studies showed the presence of various group of compounds flavonoids, xanthophylls, phycobilins in methanol and aqueous extract predominantly. These study parameters will be highly helpful to take up the new studies on various aspects of its biological activity.

Keywords: *Laportea interrupta* L., stinging nettle, phytochemical studies, spectroscopic studies.

I. INTRODUCTION

Laportea interrupta L. Chew, commonly known as stinging nettle is one of the medicinal plants used by the traditional healers of India for treatment of various illnesses. It is a small plant usually found in agriculture wet land area as weed. The plant is also called Hen's nettle in English, Batti-schoringenam or Aanathumba in Malayalam. The taxonomy details of the plant are as follows (1-2).

Kingdom : Plantae - Plants
Sub-kingdom : Tracheobionta – Vascular plants
Division : Magnoliophyta- Flowering plants
Class : Magnoliopsida – Dicotyledons
Subclass : Hamamelididae
Order : Urticales
Family : Urticaceae
Genus : Laportea Gaudich
Species : Laportea interrupta

Synonyms:
Boehmeria javanica (Bl.)Hassk., *Boehmeria interrupta* (L.) Willd. *Urtica interrupta* L.

L. interrupta is a small, hardly branched herb bearing hairs that irritate the skin (3). The stem grows up to 20-80 cm tall. Leaves are ovate, narrow tipped, 6-9 cm long, 5-6 cm wide. Leaves have internally grooved petioles, and are broader towards the base and very near to the tip with a short furrow, cuspidate towards the anterior part with a longer tip, are also hairy and burning. The whole margin has incised with thick teeth, and has riblets standing out on the lower side and with the mid-rib proceeding from the petiole, one on both sides.

Flowers appear in short and branched peduncles, in long tender stalk-lets or petioles which arise from the origin of leaves, and in one head many collectively, and are small, light green buds and consisting of minute, white and less conspicuous leaves (4).

The leaves are used as food ingredient and used in the preparation of South Indian cuisine especially in Kerala state of India. The plant is claimed to have the biological properties like foetal-maternal health, anti-inflammatory, antimicrobial, antipyretic activity in experimental animal model systems (5-8). However, during literature search, there are no much detailed reports found in the aspects of chemical characteristics of the *L. interrupta*. So, the present study has been taken up to evaluate the methanolic and aqueous extract of *Laportea interrupta* L. Chew Leaf for its Phytochemical, Physico-chemical and spectroscopic characteristics.

II. METHODS AND MATERIAL

Plant collection and Authentication

The plant materials were collected from Western ghat region of Kerala. The plant was authenticated by the Taxonomist, Kerala Forest Research Institute, Thrissur. The Specimen voucher is maintained in the Institute.

Chemicals and Reagents

Chemicals and Regents of AR grade purchased from Spectrum India Ltd, Merck India Ltd, Nice India Ltd, were used for the present study.

Extraction

The shade dried *L. interrupta* Leaf was used for the present study. The extraction was carried out by soxhlet extraction method using methanol as solvent. The aqueous extract was prepared as per Ayurvedic Pharmacopoeia of India Part II Vol I.

Physico-chemical Analysis

Physico-chemical analysis such as moisture content, total ash, water soluble ash, acid insoluble ash, water soluble extractive and alcohol soluble extractive were carried out as per the standard protocol mentioned below (9-13).

Phytochemical Analysis

The phytochemical analysis of the study material was carried out as per the standard protocols. It comprised of various tests including Salkowski test, Dragendorff's test, Keller Killani test and Ellagic acid test protocols (14-20).

Spectrophotometric Analysis:

Spectrophotometric characteristics were analyzed for understanding the basic chemical profiling of *Laportea interrupta* L. Leaf. The aqueous extract of leaf of *L. interrupta* was taken at two different concentrations i.e. decoction as such and 1/10 dilution. The methanol extract of leaf was taken at two different concentrations such as 50 mg% and 12.5 mg%. The extract was dissolved in methanol for spectroscopic analysis, and pure methanol was used as blank. The spectrum characteristics were measured after standardizing the procedures and analysis was confirmed by carrying out triplicate analysis (21-24).

III. RESULT AND DISCUSSION

The Physico-chemical characteristics viz moisture content, total ash, acid insoluble ash, water soluble ash, alcohol soluble extractive and water soluble extractive were carried out for shade dried *Laportea interrupta* leaf. The details of this proximate analysis have been mentioned in Table 1. The qualitative Phytochemical analysis was carried out for aqueous and methanolic extract of *L. interrupta* leaf. The aqueous extract showed the presence of glycosides, terpenoids, flavonoids and saponins. The methanolic extract exhibited the highly presence of glycosides and terpenoids and low level presence of alkaloids and cardiac glycosides (Table 2). Spectroscopic analysis of aqueous extract of *L. interrupta* leaf showed major peaks on particular wavelengths corresponding to anthocyanins (517nm), carotenoids (474nm), xanthophylls (438nm) and hydroxy cinnamic acid (324nm). The aqueous extract at 1:10 concentrations

exhibited the presence of flavonoids and flavanones at 318nm and 300nm respectively (Figure 1-2; Table 3-4).

Spectroscopic analysis of methanolic extract of *L. interrupta* leaf showed the major peaks at the wavelengths of 673, 619, 477, 435, 319 nm representing the presence of group of various compounds in the category of chlorophylls, phycobilins, xanthophylls, cytochromes and flavonoids respectively. The presence of coumarins (209nm) and chlorophylls (662nm) were observed in the methanolic extract of *L. interrupta* leaf studied at the concentration level of 12.5 mg% (Figure 3-4; Table 5-6).

TABLE 1. The physico-chemical analysis of *Laportea interrupta* L. Leaf.

S. No.	Physico-chemical parameters of *Laportea interrupta* L. Leaf	Value in (gm %)
1	Moisture content	8.74
2	Total ash	14.72
3	Acid Insoluble ash	6.19
4	Water soluble ash	0.761
5	Alcohol soluble extractive	5.90
6	Water soluble extractive	16.18

TABLE 2. Phytochemical characteristics of methanolic extract of *L. interrupta*

S. No	Phytochemical test details	Aqueous extract of Leaf	Methanolic extract of Leaf
1	Tannins (Lead sub-acetate test)	-	-
2	Saponins (Foam test)	++	-
3	Alkaloids (Dragendorff's test)	+	+
4	Terpenoids (Salkowsky's test)	+++	+++
5	Cardiac glycosides (Keller-killani)	-	+
6	Flavanoids (Alkaline reagent test)	++	+
7	Glycosides (Fehling's test)	+++	+++
8	Anthraquinones (Modified Borntrager's test)	-	-
9	Proteins	-	-

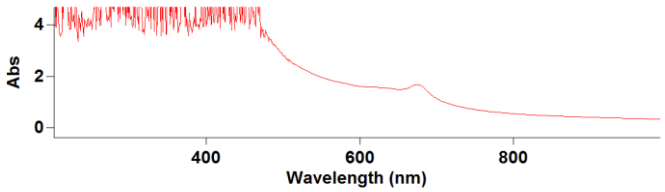

Figure 1. Spectroscopic analysis of aqueous extract of *L. interrputa* Leaf

TABLE 3. Details comprising of major peaks and their corresponding wavelength of Aqueous extract of *L. interrupta* Leaf.

Sample Name: Aqueous extract of *L. interrupta* Leaf (Decoction)	
Wavelength	Absorbance
674.0	1.670
517.0	2.458
474.0	3.826
438.0	4.449
324.0	4.581
202.0	3.995

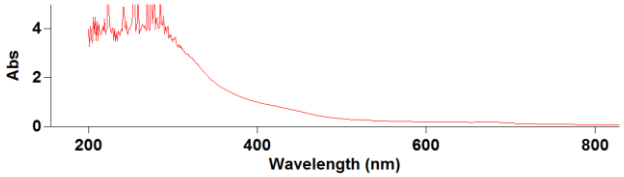

Figure 2. Spectroscopic analysis of aqueous extract of *L. interrputa* Leaf at 1: 10 concentration.

TABLE 4. Major peaks and their corresponding wavelength of aqueous extract of *L. interrupta* Leaf at the concentration of 1:10

Sample Name: Aqueous extract of *L. interrupta* Leaf at the concentration of 1:10.	
Wavelength	Absorbance
675.0	0.192
318.0	2.977
300.0	3.578
202.0	4.113

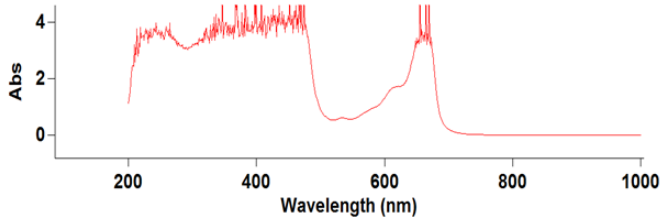

Figure 3. Spectroscopic analysis of methanolic extract of *L. interrputa* Leaf at the concentration of 50mg%.

TABLE 5. Major peaks and their corresponding wavelengths of methanolic extract of L. *interrupta* Leaf at the concentration of 50 mg%.

Sample Name: *L.interrupta* Leaf Methanol **50mg%** at 200-1000 nm	
Wavelength	Absorbance
673.0	3.463
658.0	3.735
619.0	1.729
534.0	0.613
477.0	3.923
435.0	4.584
416.0	3.631
319.0	3.695
209.0	3.200

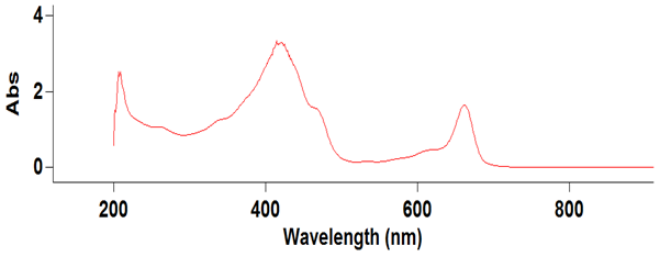

Figure 4. Spectroscopic analysis of methanolic extract of *L. interrputa* Leaf at the concentration of 12.5 mg%.

TABLE 6. Major peaks and their corresponding wavelengths of *L. interrupta* Leaf at the concentration of 12.5 mg%.

Sample Name: *L.interrupta* Leaf Methanol **12.5mg%** 200-1000 nm	
Wavelength	Absorbance
662.0	1.639
534.0	0.158
432.0	2.955
425.0	3.246
209.0	2.527

IV. CONCLUSION

Laportea interrupta is one of the ethnomedicinal value plant widely used by the traditional healers of Kerala, India. In south India, some people are using this plant especially tender leaf as food ingredient. The present study has been aimed to carry out detailed physico-chemical, Phytochemical and spectroscopic characteristics of *Laportea interrupta* Leaf. The Physico-chemical analysis of *L. interrupta* leaf showed the presence of various levels of ash. The Phytochemical analysis showed the presence of major compounds like glycosides, terpenoids and saponins. The spectroscopic analysis of aqueous and methanolic extracts showed the presence of various group of compounds like xanthophylls, flavonoids, anthocyanins and carotenoids. The presence of such group of compounds is expected to be responsible for its

various biological activities. However, the detailed scientific studies are very essential for confirmation of the compounds present in them.

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