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An Analytical Study On Zanthoxylum Ovalifolium (Wight)- As An Anticancer Drug

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Abstract: The plant Zanthoxylum Ovalifolium (wight) have been used in the treatment of cancer in Indian traditional medicine. All parts of this plant have medicinal values but most precious is leaf of this plant. folklore medicine has long served as a valuable resource for treating various health conditions, especially in rural parts of India. One such medicinal plant is Zanthoxylum Ovalifolium (Wight). Species from the Rutaceae family, it is commonly seen in Western Ghat built of south India. known as thorny yellow wood and Aremadalu in Kannada, which has been traditionally used to manage a range of ailments, including inflammation, pain, digestive disorders, and notable cancer. The present study is to investigate the anticancer potential of Zanthoxylum Ovalifolium (Wight), as per folklore claim with a focus on both its traditional and contemporary scientific evidence. Based on this background, the study aims to conduct a preliminary analytical study of the plant. Which includes its phytochemical composition, and its pharmacological activities. This study also highlights the results of standardization (identity, purity & strength) tests, and preliminary phytochemical screening.

Index Terms **-** *Zanthoxylum Ovalifolium* (Wight), Phytochemical analysis.

Introduction

Cancer is the second leading cause of death worldwide. In India, oral cancer ranks third among all cancer with an incidence rate of approximately 64.8%[1,2]. Traditional or folklore medicine has long served as a valuable resource for treating various health conditions, especially in rural parts of India. One such medicinal plant is Zanthoxylum Ovalifolium (Wight). Species from the Rutaceae family, is native to South India, particularly the Western Ghats. Commonly known as thorny yellow wood , which has been traditionally used for dietary supplement, and also can be used for disorders, including inflammation, pain, digestive disorders, and notably, cancer[3].

The present study is to investigate the anticancer potential of Zanthoxylum Ovalifolium (Wight), as per folklore claim with a focus on both its traditional and contemporary scientific evidence. Based on this background, the study aims to establish the pharmacognostical characteristics and conduct a preliminary analytical study of the plant. Which includes its phytochemical composition, and pharmacological activities.

Materials and Methods

Pharmacognostical, and Phytochemical analysis, were carried out for the drug in accordance with API guidelines[4].

Collection of samples: Zanthoxylum Ovalifolium (Wight) fresh leaf was collected from Moodubidire. the collected sample was botanically identified and authenticated by Department of Dravyaguna at AAMCH, Moodubidire.

Pharmacognostic study:

Macroscopic studies: The external features of the Zanthoxylum Ovalifolium (Wight). Leaf was observed and documented using camera. Organoleptic evaluation and Determination of physicochemical parameters was also carried out as per API guidelines.

Physico-chemical study: Aqueous extract in the kalka form was used in this study as per folklore claim.

I. RESULTS

Pharmacognostical Study:

Macroscopic Features of *Zanthoxylum Ovalifolium* (Wight), Leaf which is shown in Fig.1.

- Leaf Type: Trifoliate
- Midrib: Prominent on the lower surface
- Petiole: Stout, up to 3 cm long
- Leaflets: 3 per leaf, each measuring 2-5 cm in length and breadth
- Shape: Elliptic-oblong or obovate
- Margin: Crenulate, serrate
- Venation: Submarginal
- Apex: Acuminate tip
- Surface Features: Presence of prickles over the midrib on both upper and lower surfaces

Fig.1: *Zanthoxylum Ovalifolium* (Wight), Leaf

Organoleptic Characteristics:

- Colour: Dark green (upper surface), pale beneath
- Odour: Characteristic
- Taste: Kashaya (astringent)
- Texture: Coriaceous (leathery)

Physico-Chemical Analysis:

Determination Of Moisture Content:

Total moisture loss percentage of leaf of *Zanthoxylum Ovalifolium* (Wight):

The percentage of moisture content of leaf was 30.42%., the sample is shown in Fig.2.

Fig .2: The *Zanthoxylum Ovalifolium* (Wight), Leaf samples

Water Soluble Extractable Value: Fig.3

Weight of extract obtained from the sample drug is shown in Table no.1

Table no.1: Weight of extract obtained from the sample drug

Sample (Ml)	Extract weight (gm)
100	0.777g

Fig. 3: Extract obtained from the sample drug

Alcohol Soluble Extractable Value: Fig.4

Weight of extract obtained from the sample drug *Zanthoxylum Ovalifolium* (Wight), leaf is shown in Table no.2

Table no.2: Weight of extract obtained from the sample drug

Sample (Ml)	Extract weight (gm)
100	0.904g

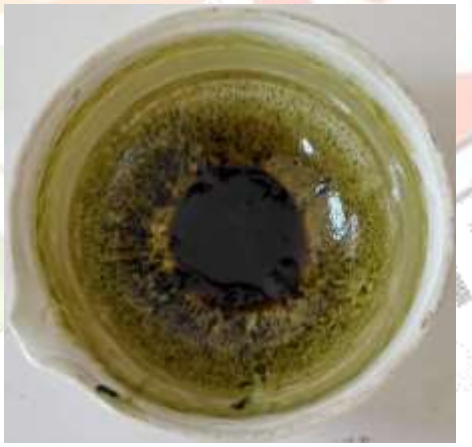

Fig.4: Alcohol soluble extractive of *Zanthoxylum Ovalifolium* (Wight)

Ash Analysis[5]: Fig.5

Weight of ash obtained from sample drug *Zanthoxylum Ovalifolium* (Wight), is shown in Table no.3.

Table no.3: Weight of ash obtained from sample drug

Sl. No.	Total sample weight	Ash weight
1	15 gm	1.071 gm

Percentage of ash value of sample drug *Zanthoxylum Ovalifolium* (Wight), leaf is shown in Table no.4.

Table no.4: Percentage of ash value of sample drug

Sl. No.	Ash	Percentage of ash
1	Total ash	7.14%
2	Acid insoluble[8] ash	7.536%
3	Water insoluble[9] ash	9.294%

Fig.5: Ash obtained from sample drug *Zanthoxylum Ovalifolium*

Inorganic Salt Analysis:

Inorganic salts present in acid soluble ash:

Inorganic salts present in ash from proximate analysis is shown in Table no.5

Table no.5: Inorganic salts present in ash from proximate analysis

Sl. No.	Inorganic salts	Acid boiling filtrate	Alkali boiling filtrate	Acid soluble filtrate
1	Carbonates	Absent	Absent	Absent
2	Fluorides	Present	Present	Absent
3	Chlorides	Absent	Present	Present
4	Sulphates	Present	Present	Present
5	Chromates	Absent	Absent	Absent
6	Phosphates	Present	Present	Present
7	Potassium	Absent	Absent	Absent
8	Sodium	Absent	Absent	Present
9	Aluminium	Present	Absent	Present
10	Calcium	Present	Present	Absent

Results of acid soluble ash analysis: Fig.6

Fig. 6: Acid soluble ash analysis

Inorganic Salts[6] present in water soluble Ash: Fig.7

Table no 6 shows results of Inorganic salts present in water soluble as.

Table no.6: Inorganic Salts present in water soluble Ash

Sl. No.	Inorganic salts	Water boiling filtrate	Water soluble filtrate
1	Carbonates	Absent	Absent
2	Fluorides	Absent	Absent
3	Chlorides	Present	Present
4	Sulphates	Absent	Present
5	Chromates	Present	Absent
6	Phosphates	Present	Absent
7	Potassium	Absent	Absent
8	Sodium	Absent	Present
9	Aluminium	Absent	Present
10	Calcium	Absent	Present

Fig.7: Inorganic Salts present in water soluble Ash

Determination Of Ph Value[7]:

The pH value of water extract *Zanthoxylum Ovalifolium* (Wight), leaf was found to be with electrical conductivity of 6.67+88mV. Phytochemical Analysis of *Zanthoxylum Ovalifolium (*Wight) is shown in Table no.7 and Fig.8

Table no.7: Phytochemical Analysis of *Zanthoxylum Ovalifolium (*Wight)

TESTS	RESULTS
Carbohydrates	
a) Benedict's	Absent
b) Fehling's	Absent
Protein	
a) Biuret's	Absent
b) Millon's	Absent
Starch	Absent
Alkaloids	Absent
Flavonoids	Present
Terpenoids	Present
Sterols	Present
Phenolics	Present
Tannins	Present
Saponins	Absent
Resins	Absent
Glycosides	Absent

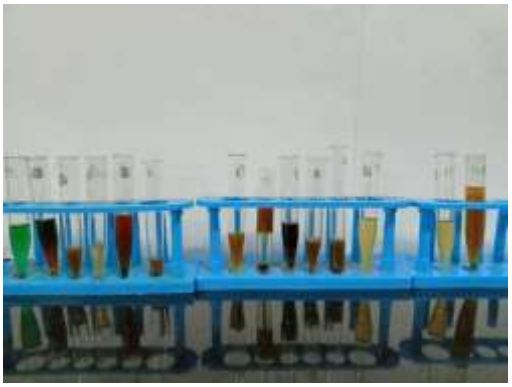

Fig.8: Phytochemical Analysis of *Zanthoxylum Ovalifolium (*Wight)

II. DISCUSSION

The results of the pharmcognostic and phytochemical study helps in development of standardization of Zanthoxylum Ovalifolium (Wight) with respect to its identity, purity and genuinity. Organoleptic features include taste of drug which was Kashaya rasa and ushna veerya and known for its vatahara. property. Physicochmical analysis includes total ash and acid insoluble ash contents are important to determine quality and purity of herbal medicines. Loss on drying of the leaf was found to be 30.42%. This suggests that drug is having more water content or hygroscopic in nature. The drug is more soluble in water. Acid soluble extract was little higher compared with water soluble extract it indicates higher concentration of polar compound. Hence yield will be more but it may not be much useful in this anticancer study understanding. The drug pH result shows slightly acidic nature, which matches with pH of oral cavity by which it helps to maintain oral pH by drug Zanthoxylum Ovalifolium (Wight). Anticancer activity of Zanthoxylum Ovalifolium (Wight) by the mechanisms like antioxidant action, apoptosis induction, and inhibition of cell proliferation action, it was proved by previous studies in particular by few cell line and pharmacological[8] studies.
Phytochemical such as:

Tannins – Contribute to immune modulation and cell apoptosis
Flavonoids – Antioxidant and anti-inflammatory
Alkaloids – Known for cytotoxic and antiproliferative activities
Terpenoids specifically may act by disrupting cancer signaling pathways such as NF-κB and PI3K/Akt, and can also cause cell cycle arrest.

III. CONCLUSION

The drug Zanthoxylum Ovalifolium (Wight) is a plant with highly medicinal value. It was reviled by presence of terpenoids, sterols, phenolics and tannis in phytochemical study. These phytochemicals contributed to its anticancer activity.

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