“PRELIMINARY PHYTOCHEMICAL 
PHARMACOGNOSTICAL 
STUDY OF FICUS CITRIFOLIA” FAMILY – MORACEAE

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Abstract: The aim of the present study was to investigate the preliminary Phytochemical screening of Ethanol, Chloroform, Ethyl acetate and water extract of Ficus citrifolia and formulation & evaluation of anti-fungal activity. Secondary Metabolite (Phytochemical screening) and proximate content are present in Ficus citrifolia stem. The leaves of this plant are present in Ficus Citrifolia stem. The leaves of this plant are simple and can be range from 2-4 inches and turn purple from yellow when riped. Ficus contain Flavonoids, xanthenes, tannins, saponins, steroids, alkaloids. Ficus citrifolia is a flowering tree of the family Moraceae. It is used in traditional medicine for a wide range of ailment related to digestive, endocrine, reproductive and respiratory system. It is also used gastrointestinal tract and urinary tract infection.

Keywords: Ficus citrifolia, phytochemical screening, Anti-funga. Secondary Metabolites Proximate.

INTRODUCTION:
The Species name citrifolia is a combination of Latin prefix citri which means “citron-like” and the Latin suffix folia meaning “leave” which describe the trees leaves looking resemblance to those of many other citrus species. The leaves of this plant are simple and can be range from 2-4 inches. Fruits appear on elongated stalk are 1 inch on diameter and can be turn to purple from yellow when ripe.
In addition, the consumers experience numbness or soreness of the mouth due to natural enzyme that contain in the fruit. Ficus citrifolia is a flowering tree of the family Moraceae and genus Ficus. It can drop aerial roots from the branch and spread horizontally and fusing the parent tree as they grow. Economic importance of this plant includes use as a component of diet for animal including human being and its therapeutic value for chemotherapeutic patients. Ficus species contains flavanoids, xanthenes, tannins, saponins, steroids, alkaloids, triterpinoids, triterpenes, cardioglycosides and xanthoproteins. This plant is also known as shortleaf fig and is species of banyan native to southern florida and it have a genus of about trees, shrubs and vines in the family Moraceae many of which are commonly known as figs. The most extraordinary found in the forest of South America. They are distributed throughout the world’s tropic. Ficus citrifolia house smaller size leaves and finer leaf venation has red fruits when ripe that are borne on slender stalks. ²

Table no.1 Taxonomical classification of Ficus citrifolia .³

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clade</td>
<td>Tracheophytes</td>
</tr>
<tr>
<td>Family</td>
<td>Moraceae</td>
</tr>
<tr>
<td>Genes</td>
<td>Ficus</td>
</tr>
<tr>
<td>Subgenus</td>
<td>F. subejUrostejima</td>
</tr>
<tr>
<td>Species</td>
<td>F. citrifolia</td>
</tr>
<tr>
<td>Botanical name</td>
<td>F. citrifolia</td>
</tr>
</tbody>
</table>

Fig. 1: fruits with leaves
Fig.2: fresh leaves.
PHARMACOGNOSTIC STUDY:
The present Pharmacognostic study of “Ficus citrifolia” includes the following:
3. Organoleptic properties.
4. Microscopic evaluation.
5. Fluorescence Analysis.
6. Physiochemical screening.
   - Determination of the moisture content.
   - Determination of Ash values:
     - Total ash
     - Acid soluble ash
     - Water soluble ash
   - Determination of percentage extractive:
     - Alcohol soluble extractive
     - Water soluble extractive
   - Loss on drying.
7. Determination of pH.

MATERIAL AND METHODS:

1. Collection and Processing

- Collection of plant sample: The Ficus citrifolia plant leaves were collected from area Sabha wala road Dehradun, Uttarakhand in the month of January 2022 and the sample were authenticated at the Botanical Survey of Dehradun Uttarakhand India.

- Processing of plant sample: The plant leaves were washed thoroughly and shade dried for two weeks which it was grinded until it was uniform powder and this powder was used for evaluation of different parameters and preparation of different extracts.

- Preparation of different extract using different solution of air dried powder of Ficus citrifolia: The extract of leaf sample is prepared by using soxhlet apparatus 30g of air dried powder in 500 ml of four different solvents viz., chloroform, ethyl acetate, alcohol and water. This apparatus work on higher temperature with evaporation process. Extract preparation by soxhlet apparatus used for 12 hour continuously for each solution. The extracts are then filtered using filter paper evaporated and dried then respective extracts were used for further experimentation.

2. Morphological Identification:
   The plants were identified properly by their morphological features and are compared with the standard.

3. Organoleptic properties:
   Substances that create an individual experience via the sense which includes colour, touch, odour and taste.

4. Microscopy evaluation:
   Microscopy (T.S) and powder characters of leaf and stem were done using compound microscope, inbuilt light microscope and photographs were taken. Quantitative microscopical measurements were made using eye piece, stage micrometre and camera Lucida. All the chemicals, reagents and solvents used are of A.R grade.
   - Microscopy of “Ficus citrifolia” leaf: The leaf sample was studied microscopically by taking transverse section (T.S) through there different sections of leaf: Apex, Middle and Bottom. Every section was cut from each part with very small portion of lamina and thin section was stained with safranin then observed under compound microscope.
   - Microscopy of “Ficus citrifolia” stem: The stem was cut into thin section and stained with safranin then observed under compound microscope.
   - Powder microscopy: Fine powder sample was mounted on a clean glass slide and clarified with clearing solution then observed for identification of distinctive characters.
   - Quantitative microscopy:
     - Stomatal Number and Stomatal index: The upper epidermis of leaf between midrib and lamina were peeled and transparent area was cleared with clearing solution and mounted on a glass slide. The stomata and epidermal cells were rough out on blank sheet between 0.2mm square using prism type camera Lucida under high power (45x).The number of epidermal cells and stomata were counted as per rule from each drawn square.
     \[
     \text{Stomatal Index} = \frac{\text{Number of stomata}}{\text{Number of Stomata} + \text{Epidermal cells}} \times 100
     \]
     - Vein-Islet and Vein termination Number: The leaf portion between midrib and margin were macerated and faded with bleaching solution. The cleared lamina portion was mounted on a glass slide and vein islet and vein termination were rough out on
black sheet between 0.5mm square using low power (5x) and values were determined per sq.mm of leaf area between midrib and margin.

- **Palisade ratio**: The leaf sample was crumbling with caustic soda and conc.HCl by boiling on water bath and bleached with bleaching solution then clarified epidermal cells that were rough out. The average numbers of palisade cells were rough out. The average numbers of palisade cells were calculated and palisade ratio was determined.

5. **Fluorescence Analysis**:

Fluorescence analysis helps in the analysis of chemical constituents. The leaves of “Ficus citrifolia” were dried in shade to prevent decomposition of active principle and make fine powder for the fluorescence study. A small quantity (1gm) of dried and finely powdered leaves was treated with freshly prepared acid, alkaline solutions, and different solvents as well as chemical reagents and observed at UV short wavelength (254nm) and long wavelength (365nm). The response at different wavelengths was recorded.

6. **Physiochemical screening**:

- **Determination of the moisture content**

2gms of sample is taken in a petri plate and weighed. Petri plates with samples were kept in the oven and maintained at 110°C for drying. After 1hrs Petri plates were taken out and weight was noted down. This procedure is repeated three times until the constant weight is reached.

\[
\text{Moisture content of the drug (\%) = \frac{\text{Loss in weight of the sample}}{\text{Weight of the sample}} \times 100}
\]

- **Determination of Ash values**:

  - **Total ash:**

    2 gms of each powder was taken in 3 heated silica dishes to avoid any moisture content. The materials were combustion to 100° - 150°C in an electric ignition till the seared of the drug and kept in incinerator at 50°C, temperature and allow to roll back to Zero then it was removed from furnace and cooled in desiccators to room temperature and weighed.

    \[
    \text{Total ash} = \frac{\text{weight of residue} \times 100}{\text{weight of the sample}}
    \]

  - **Acid insoluble ash:**

    The total ash which was obtained was boiled for 5 minutes with 25ml of diluted hydrochloric acid and collected the insoluble matter in an ash less filter paper, washed with hot water and ignited to constant heat.

    \[
    \% \text{ of acid insoluble ash} = \frac{\text{difference in weight} \times 100}{\text{weight of sample}}
    \]

  - **Water soluble ash:**

    The total ash obtained above was boiled with 25ml of distilled water for 5 minutes. The insoluble matter was collected on an ash less filter- paper, washed with hot water and ignited to constant weight at low temperature. The weight of insoluble matter was subtracted from the weight of total ash that represents water soluble ash. The percentage and result of water soluble ash was calculated with reference to the air dried drug.

    \[
    \% \text{ of water insoluble ash} = \frac{\text{difference in weight} \times 100}{\text{weight of sample}}
    \]

- **Determination of percentage extractive**:

  - **Alcohol soluble extractive**:

    5 gm air dried coarse powder was macerated with 100 ml of 95% ethanol in a closed flask and shake continuously for 24hrs kept in a mechanical shaker for 6hours and allowing stand for 18 hours. Thereafter, it was filtered rapidly through whatman filter paper taking precautions against loss of the solvent. Evaporated 25ml of the filtrate to dryness in a tared flat bottom shallow dish dried at 105°C and weighed. The percentage of ethanol soluble extractive value was calculated with reference to the air dried drug was calculated.

    \[
    \% \text{ alcohol soluble extractive} = \frac{\text{difference in weight} \times 100}{\text{weight of the sample}}
    \]

  - **Water soluble extractive**:

    5 gm air dried coarse powder was macerated with 100 ml of chloroform water in a closed flask and shake continuously for 24hrs and kept in a mechanical shaker for 6hours and allow to stand for 18 hours. Thereafter, it was filtered rapidly through whatman filter paper taking precautions against loss of the solvent. Evaporated 25ml of the filtrate to dryness in a tared flat bottom shallow dish dried at 105°C and weighed. The percentage of water soluble extractive value was calculated with reference to the air dried drug was calculated.

    \[
    \% \text{ water soluble extractive} = \frac{\text{difference in weight} \times 100}{\text{weight of the sample}}
    \]

- **Loss on drying**:

  The powdered leaves of “Ficus citrifolia” was dried in the oven at 85-90°C to constant weight. The test was performed in triplicate and percentage of loss on drying was calculated.
% Loss on drying = difference in weight x 100
weight of the sample

7. Determination of pH:
The determination of pH was carried out at room temperature of 25ºC. Calibration of the apparatus was done by using buffer solution to pH 7 water soluble and alcohol soluble solutions was kept ready, then the electrodes were drench in both the solutions and readings were recorded.

RESULT AND DISCUSSION

Pharmacognostic Studies:
Morphological Identification:
Ficus citrifolia is a large deciduous tree with dark brown and more or less smooth bark.

Organoleptic characters:
Table no.2 Organoleptic properties :
<table>
<thead>
<tr>
<th>Samples</th>
<th>Color</th>
<th>Touch</th>
<th>Odor</th>
<th>Taste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ficus citrifolia</td>
<td>green</td>
<td>Slightly coarse</td>
<td>pungent</td>
<td>bitter</td>
</tr>
</tbody>
</table>

Swelling index
The swelling index is the volume in ml taken up by the swelling of 5gm of plant material under specified conditions. Its determination is based on water.
Drug = 5g
Measuring cylinder = 15ml, Distilled water = 25ml
Results = 20.5 ml

Microscopic evaluation of “Ficus citrifolia”:
Leaf Microscopy:
a. Apex of leaf: T.S shows underdeveloped brevity, calceiform, reticulate elements with affix fibres and parenchyma, some pieces of parenchyma with polygonal to rounded cells with intercellular spaces, few translucent resinous droplets.
b. Middle of leaf: T.S shows bifacial structure in midrib and lamella region, single layer upper epidermal cells which are rectangular with cuticulized outer walls and presence of trichrome, epidermal layer of lamina continuous over midrib region also with numerous trichrome. Mesophyll differentiates to palisade and parenchyma. Palisade cells are single layer compact and radially elongated. Many layers of Parenchyma loosely arranged with intercellular spaces, few translucent resinous droplets. Lower epidermis is similar to upper epidermis with stomata and numerous trichrome.
c. Base of leaf: T.S shows reticulate elements with attached fibres and parenchyma, some pieces of parenchyma with polygonal to rounded cells with intercellular spaces, few translucent resinous droplets. Single layer upper epidermal cells which are rectangular with cuticulized outer walls and presence of trichrome, Lower epidermis is similar to upper epidermis with stomata and numerous trichrome.

Figure.3  Leaf microscopy
A. Apex of leaf.  B. Middle of leaf.
C. Base of leaf

**Stem Microscopy:** T.S of Ficus citrifolia stem shows cortex with hypodermis (collenchyma’s) and endodermis (starch cells) present above pericyclic and vascular bundles, the outer epidermis with stomata and trichrome, two pipe like tissues xylem and phloem separated by cambium, Pith in the centre.

**Powder Microscopy:**
Pieces of broken trachery tissue with calceiform, reticulate and broadened pitted elements with attached fibres and parenchyma, some pieces of parenchyma with polygonal to rounded cells with intercellular spaces, fragments of xylem, fibres and part of small group of fibres, trichrome, few translucent resinous droplets appearing are found in the microscopic study of Ficus citrifolia.
Table no.2 Fluorescences analysis:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Interaction of powder drug with different reagent.</th>
<th>Color produced under visible light.</th>
<th>Colored produced under uv-radiation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Short (254)nm wavelength Long (366nm) wavelength</td>
</tr>
<tr>
<td>1.</td>
<td>Drug</td>
<td>Light green</td>
<td>Light green Dark green</td>
</tr>
<tr>
<td>2.</td>
<td>P + 5% fecl3</td>
<td>black</td>
<td>Black</td>
</tr>
<tr>
<td>3.</td>
<td>P + con. H2SO4</td>
<td>Greenish brown</td>
<td>Green</td>
</tr>
<tr>
<td>4.</td>
<td>P + HNO3</td>
<td>Brown reddish</td>
<td>Light green Brown</td>
</tr>
<tr>
<td>5.</td>
<td>P + HCl</td>
<td>Greenish brown</td>
<td>Light green Black</td>
</tr>
<tr>
<td>6.</td>
<td>P + acetic acid</td>
<td>Light green</td>
<td>Light green Dark green</td>
</tr>
<tr>
<td>7.</td>
<td>P + Iodine</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>8.</td>
<td>P + Picric acid</td>
<td>Green</td>
<td>Light green Black</td>
</tr>
<tr>
<td>9.</td>
<td>P + 50% alcohol</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>10.</td>
<td>P + 50% methanol</td>
<td>Green</td>
<td>Brown</td>
</tr>
<tr>
<td>11.</td>
<td>P + CHCl3</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>12.</td>
<td>P + 10g Na2CO3</td>
<td>Dark green</td>
<td>Brown</td>
</tr>
<tr>
<td>13.</td>
<td>P + NaOH</td>
<td>yellowish green</td>
<td>Greenish brown Black</td>
</tr>
<tr>
<td>14.</td>
<td>Benzene</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>

Table No.3: Physiochemical screening of ficus citrifolia:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values (%)w/w</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Determination of the moisture content</td>
<td>6.50</td>
</tr>
<tr>
<td>2. Determination of Ash values</td>
<td></td>
</tr>
<tr>
<td>Total ash</td>
<td>4.95</td>
</tr>
<tr>
<td>Acid soluble ash</td>
<td>0.67</td>
</tr>
<tr>
<td>Water soluble ash</td>
<td>2.85</td>
</tr>
<tr>
<td>3. Determination of percentage extractive</td>
<td></td>
</tr>
<tr>
<td>Alcohol soluble extractive</td>
<td>11.74</td>
</tr>
<tr>
<td>Water soluble extractive</td>
<td>9.15</td>
</tr>
<tr>
<td>4. Loss on drying</td>
<td>9.20</td>
</tr>
</tbody>
</table>

Table no.4 Determination of pH:

<table>
<thead>
<tr>
<th>Sample</th>
<th>pH alcohol</th>
<th>pH water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ficus citrifolia</td>
<td>5.23</td>
<td>4.73</td>
</tr>
</tbody>
</table>

CONCLUSION:
The plant was collected from the Sabhawala road Dehradun; Uttarakhand. This plant represents an attractive source of secondary metabolites especially lignans. On further research plant latex is recommended for therapeutic use as well. It is also used in traditional medicine for wide range of ailments that’s why it has a large demand with great benefits. The Pharmacognostic investigations of this plant help in the Identification and verification of taxon. The detailed phytochemical analysis of bark reveals that it contains tannins, flavonoids, steroids and triterpinoids. Microscopical study focuses on various characteristics such as cork cell, medullary rays, calcium oxalate crystal, starch grains and lignified fibbers of the bark of this plant and helps in further analysis of this plant species.

REFERENCE:
2. Lohdip A.M* Dithdah, A.A and timothy, SU, chemical and proximate studies of latex from the stem ficus citrifolia.
5. Pharmacognostical screening and in-vivo antiseptic activity of leaves extracts of ficus sarmentosa.