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RESEARCH ARTICLE

Pharmacognostic Evaluation of Fruit Pulp of *Livistonia Chinensis*

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ABSTRACT

Today world over, there is a great deal of interest in Ayurvedic system of medicine and thus the demand for various medicinal plants in the production of Ayurvedic medicines is ever increasing. Due to various geographical locations where these plants grew a great deal of adulteration or substitution is encountered in the commercial markets. Histological studies of the plant drugs are not only to study the adulterants but also are indispensable in accurate identification. Macroscopic character gives the physical appearance of the drug, which help in the recognition of a drug. The microscopically examination of crude drug aims at determination of the chemical nature of the cell wall along with the determination of the form and chemical nature of the cell contents. Standard procedure should be adapted to get the qualitative information about the purity and standard of a crude drug including the determination of various parameters like ash values, extractive values and moisture content studies. All though the active constituents of plant *Livistonia chinensis* mainly used in various type of cancer disease. In present investigation by using simple macro and micro techniques accurate identification of plant *Livistonia chinensis* has been established.

KEYWORDS

Livistonia chinensis, Arecaceae, Macroscopic, Microscopic features, Standardisation

INTRODUCTION

Plants are the basic used. It was also reported that approximately one quarter source of knowledge of modern medicine. The basic of adults used herbs to treat a medical illness within the molecular and active structures for synthetic fields are past year in the US. According to World Health Organization, medicinal plants are the best sources to potential sources of antimicrobial compounds.[1]

India is endowed with a rich wealth of medicinal plants which have been a valuable source of natural products for maintaining human health.

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A large number of these medicinal plants are used in several formulations for the treatment of various diseases caused by microbes According to World Health Organization; medicinal plants would be the source of obtaining a variety of drugs. Various societies across the world have shown great interest in curing diseases using plants/ plant based drugs. Microbes are closely associated with the health and welfare of human beings. Some are beneficial and some are detrimental. As preventive and curative measures, plants and their products are used in the treatment of infections for many centuries ago. WHO estimated that 80% of the people worldwide rely on plant based medicines for their primary healthcare and India happens to be the largest user of traditional medical cure, using 7000 plant species.[2]

Natural products including plants, animals and minerals are the basis of treatment of human diseases. History of medicine dates back practically to the existence of human civilization. The currently accepted modern medicine or allopathy has gradually developed over the years by scientific and observational efforts of scientists. However the basis of its development remains rooted in traditional medicine and therapies. The history of medicine includes many ludicrous therapies. Nevertheless, ancient wisdom has been the basis of modern medicine and will remain as one important source of future medicine and therapeutics. The future of natural products drug discovery will be more holistic, personalized and involve wise use of ancient and modern therapeutic skills in a complementary manner so that maximum benefits can be accrued to the patients and the community. Traditional knowledge-driven drug development can follow a reverse pharmacology path and reduce time and cost of development.[3]

The World Health Assembly in resolutions has emphasized the need to ensure the quality of medicinal plant products by using current control techniques and applying appropriate standards.Typical pharmacognostical studies are normally quite adequate for quality control of herbal drugs. Pharmacognostical standardization of herbal drugs include macroscopic, microscopic, physio-chemical constants and fluorescence analysis of investigated parts, and to evolve standards for single drugs and compound preparations in order to validate genuineness of the crude drugs of plant, mineral and animal origin. The study includes to highlight the macroscopical and microscopical characters as distinctive features for authentication and identification purposes. According to WHO (1998), the macroscopic and microscopic description of a medicinal plant is the first step toward establishing its identity and purity and should be carried out before any test are undertaken.[4] In this direction, the plant drug "*Livistonia chinensis*," also known as Chinese Fan Palm. It is single stemmed fan palm native to Japan and china that is cultivated worldwide in tropical and temperate climates. Common in West Indies, Bermuda; native to Asia, Africa, Pacific Islands, and Australia. one of the promising herbal drugs used in Indian and chinese system of medicine for various belongs to the family Areacaceae. Literature survey reveals that "*Livistonia chinensis*" Used as haemostatic, anti-nasopharyngeal carcinoma, anti-choroid carcinoma, anti-oesophageal cancer, and anti-leukaemia.[5,6]

The present paper deals with the standardization and distinguishing characters of *Livistonia chinensis* by using simple macroscopic and microscopic techniques.

MATERIALS AND METHODS

Materials

Livistonia chinensis fruit parts collected from the surrounding of Mastuana Sahib, Sangrur. Identity of the plant was confirmed through Department of botany, Punjabi university Patiala and they have been allotted accession no. 56568 on dated 13-12-2011. Plant is deposited in favour of my name in the Herbarium of Botany Department, Punjabi University, Patiala UNDER pun 56568.

Macroscopic Evaluation

Macroscopic character gives the physical appearance of the drug, which help in the recognition of a drug. The plant of *Livistonia chinensis* was green in colour and fruits of the plant were dark greenish to black in colour with having characteristic odour. The fruits of *Livistonia chinensis* were oblong or olive shaped (rarely globules) and having outer surface green to black green and inner surface yellow to orange. *Livistonia chinensis* bitter in taste. The results are shown in table 1.

Microscopically Evaluation of Fruit of *Livistonia Chinensis*

The microscopically examination of crude drug aims at determination of the chemical nature of the cell wall along with the determination of the form and chemical nature of the cell contents. Thus it determined the size, shape and relative

structure of the different cells and tissues in a plant.

Microscopic Studies of *Livistonia Chinensis* Fruit Part

Free hand sections taken from the fruit part of *Livistonia chinensis* were observed using compound microscope. Qualitative and quantitative studies on plants were carried out using compound microscope Photomicrographs were taken using Binocular photo-microscopic apparatus (LEICA, Italy) attached with Nikon camera.

The fruit part of *Livistonia chinensis* was dipped in water for some time until it gets soft. Free hand sections of fruit were cut and then dipped in 30% alcohol for few min. After that wash the same section with 50% alcohol then 70% alcohol and then 100% alcohol. Then shifted to eiosin dye. Again washed with 100% alcohol. Then the sections were transferred to xylene dye. Then the sections were placed on slide and mounted with dpx (1, 1-diphenyl hydrazine) solution and observed under compound microscope and then photographs were observed Nikon camera. Figure 1-2 shows the representative photo micrograph of transverse section of fruit part of *Livistonia chinensis and 3-5* shows photo micrpgraph of powder section of plant.[7]

Moisture Content

Moisture content of *Livistonia chinensis* fruit was determined using loss on drying method. Coarsely powdered drug (2-3 gm) was taken in a previously dried and was tared flat weighing bottle. Then sample was dried in an oven at 105^0 C and was dried until two consecutive weighing did not differ by more than 0.25%. Then loss on drying was calculated in mg per gram of air dried material. The results are shown in table-3.[8]

Extractive Values of Fruit of *Livistonia Chinensis*

Alcohol Soluble Extractive Value

Air dried coarsely powdered fruit drug (4 gm) was macerated with 100 ml of 95% v/v ethanol in three closed flasks for 24 hours. The flasks were shaken frequently during first six hours and allowed to stand for eighteen hours and then the extracts were filtered. The filtrates (25 ml each) were evaporated separately in tared flat bottomed shallow dishes, and dried at 105^0 C to constant weight.[8] The results are shown in table 2

Water Soluble Extractive Value

Air dried coarsely powdered fruit drug (4 gm) was macerated with 100 ml distilled water in three closed flasks for 24 hours. The flasks were shaken frequently during first six hours and were allowed to stand for eighteen hours and then the extracts were filtered. The filtrates (25 ml each) were evaporated separately in tared flat bottomed shallow dishes, and was dried at 105^0 C. The results are shown in table 2.

Ash Values

Ash values are helpful in determining the quality and purity of a crude drug, especially in the powdered form. The objective of ashing drugs is to remove all traces of organic matter, which may otherwise interfere in an analytical determination. On incineration, crude drugs normally leave an ash usually consisting of carbonates, phosphates and silicates of sodium, potassium, calcium and magnesium. The total ash of a crude drug reflects the care taken in its preparation. A higher limit of acid-insoluble ash is imposed, especially in cases where silica may be present or when the calcium oxalate content of the drug is very high.[8]

Total Ash Value

About 2 to 3 gm of the powdered drug was weighed accurately in a tarred silica crucible and was incinerated at a temperature not exceeding 450^0 C for 4 h; until free form of carbon did not seen then it was cooled and weighed. The percentage of ash was calculated with reference to air dried drug using following formula, result for total ash value is recorded in Table 2.

$$\text{Total ash value} = \frac{\text{Weight of total ash}}{\text{Weight of crude drug taken}} \times 100$$

Water Soluble Ash Value

The ash was boiled with 25 ml water. The insoluble matter was filtered and collected on an ash less filter paper, and then it was washed with hot water and ignited in a tared crucible at a temperature not exceeding 450^0 C for 4 h. Then cooled in a desiccator and weighed. Subtracted the weight of insoluble matter from the total weight of ash. The difference in weight represented weight of water soluble ash. Calculated the percentage of water soluble ash with reference to the air-dried drug using the following formula, result for total ash value is recorded in Table 2.

$$\text{Water soluble ash value} = \frac{\text{Weight of total ash - Weight of insoluble ash}}{\text{Weight of crude drug taken}} \times 100$$

Acid Insoluble Ash

The ash was boiled for 5 min with 25ml of 2M HCl. Then the insoluble matter was collected and filtered on an ash less filter paper, then it was washed with hot water and ignited in a tared crucible at a temperature not exceeding 450 C for 4 hours. The material was cooled in a desiccator and weighed. The percentage of acid insoluble ash with references to the air-dried drug was calculated using following formula; result for total ash value is recorded in Table 2.

$$\text{Acid insoluble ash value} = \frac{\text{Weight of acid insoluble ash}}{\text{Weight of crude drug taken}} \times 100$$

RESULT AND DISCUSSION

Table 1: Macroscopical features of fruit of *Livistonia chinensis*

S. No.	Parameter	Fruit
1.	**Shape & structure**	Oblong or olive shaped (rarely globose)
2.	**Colour Outer surface- Inner surface-**	Green to blue green Yellow to orange
3.	**Taste**	Bitter
4.	**Odour**	Characterstic

Table 3: Physicochemical evaluation

S. No.	PARAMETER	VALUES (%)w/w
1.	Moisture content	80.22
2.	**Extractive Values**	
	Ethanol soluble extractive	6.9
	Water soluble extractive	11.5
3.	**Ash Values**	
	Total Ash	5.11%
	Water soluble ash	4.46%
	Acid insoluble ash	0.90%

Microscopical Features of Fruit Pulp of *Livistonia chinensis*

Arrangement of tissues: Transverse section of *Livistona chinensis* fruit shows presence of epicarp consists of 5-6 layers of yellowish brown color overlapped parenchyma cells followed by the mesophyll comprising 12-15 layers of thin walled cellulosic parenchyma cells.

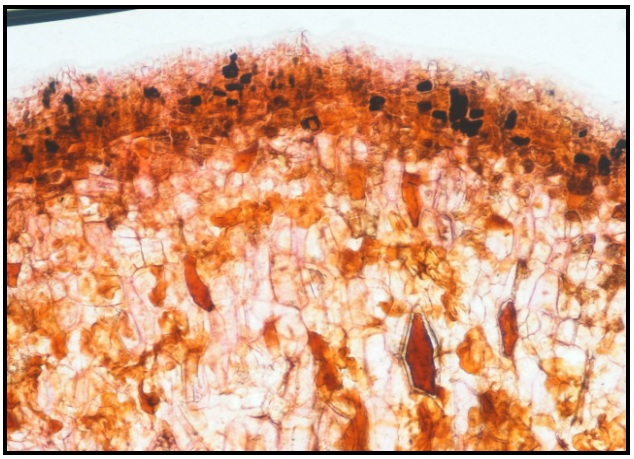

Figure 1: Representative photomicrograph of transverse section of fruit stained with eiosin dye

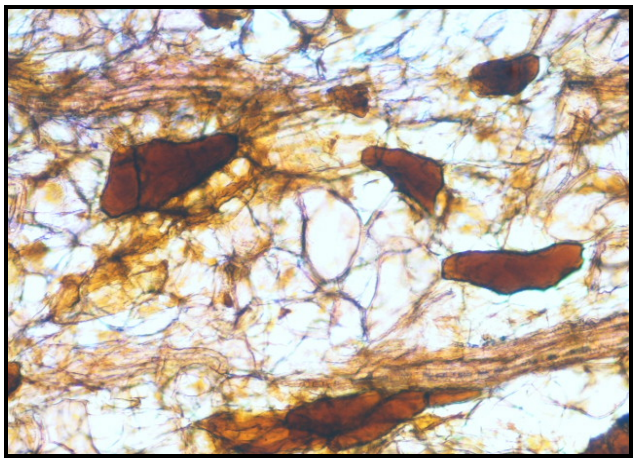

Figure.2: Representative photo micro graph of transverse section of fruit *Livistona chinensis* (a) xylem vessels (b) scattered vascular bundles

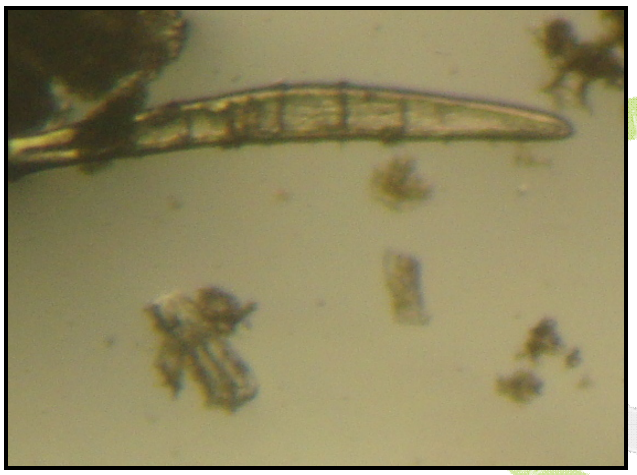

Figure 3: Representative photomicrograph of covering Trichomes of fruit pulp of *Livistonia chinensis*

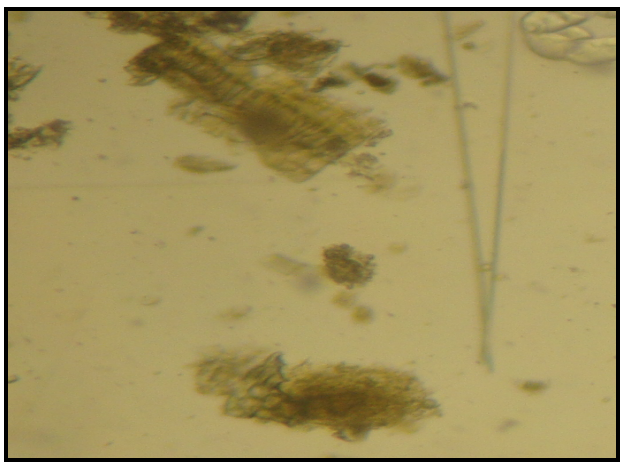

Figure 4: Representative photomicrograph of xylem vessels in powdered fruit pulp of *Livistonia chinensis*

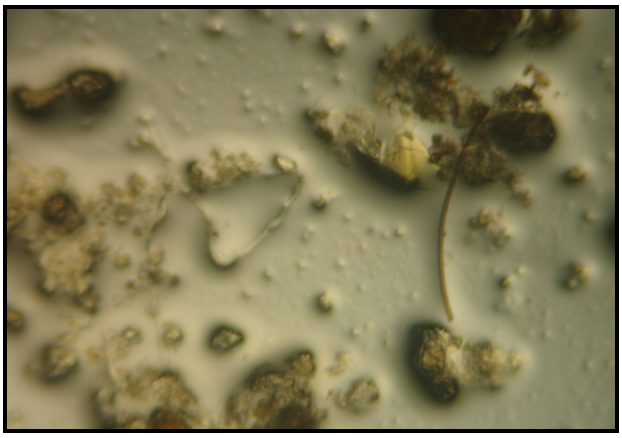

Figure 5: Representative photomicrograph of fibers in powdered fruit pulp of *Livistonia chinensis*

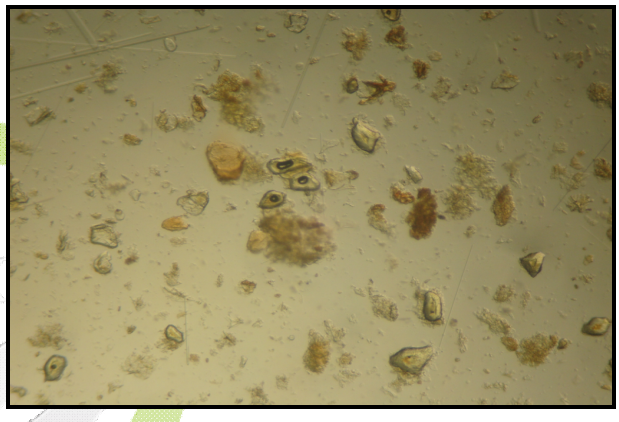

Figure 6: Representative photomicrograph of calcium oxalate crystals in powdered fruit pulp of *Livistonia chinensis*

Discussion

Livistonia chinensis was subjected to qualitative and quantitative for macroscopical and microscopical studies. Macroscopic character gives the physical appearance of the drug, which help in the recognition of a drug. The plant of *Livistonia chinensis* was green in colour and fruits of the plant were dark greenish to black in colour with having characteristic odour. The fruits of *Livistonia chinensis* were oblong or olive shaped (rarely globules) and having outer surface green to black green and inner surface yellow to orange and taste of fruit is bitter. The results are shown in table 1. In microscopy the transverse section of fruit part as well as powdered material of fruit pulp was studied for microscopic characters. Transverse section of fruit of *Livistonia chinensis* showed

arrangement of tissues – presence of epicarp, brown colored overlapped parenchyma cells followed by mesophyll and thin walled cellulosic parenchyma cells. Scattered vascular bundles consisting of xylem vessels in mesophyll region were observed .The powdered microscopy of fruit pulp of *Livistonia chinensis* showed presence of pericyclic fibre, calcium oxalate crystals, xylem vessels, covering trichomes (Fig. 1-6). Presence of excess moisture in the plant act as an adulterant and can cause decomposition in the plant material as it promotes microbial growth. Thus it should be determined and controlled. Moisture content of fruit pulp of *Livistonia chinensis* was found to be 80.22% moisture content of the fruit part was accounted for calculating values of other physiochemical parameters on dry weight bases. Determination of ash is useful for detecting adulteration with spurious, exhausted drugs, and excess of sandy and earthy matter. Most drugs contain calcium oxalate crystals, sometimes in large and variable amount. The total ash was about 5 times more than the acid insoluble ash in *Livistonia chinensis*, indicating the presence of large soluble crystals. The water soluble ash was about 9 times more than total ash in *Livistonia chinensis*. Ethanol and water were used to evaluate the extractable constituents in powder material of *Livistonia chinensis* in terms of extractive value. Water soluble extractive value of *Livistonia chinensis* was found to be about 11.5 and 4.6 times, respectively in comparison to ethanol soluble extractive value (Table 3).

CONCLUSION

In conclusion, macroscopic character gives the physical appearance to the *Livistonia chinensis*, which help in the recognition of a drug. The microscopically examination of fruit pulp of *Livistonia chinensis* aims at determination of the chemical nature of the cell wall along with the determination of the form and chemical nature of the cell contents. In other the physicochemical parameter gives result that the fruits pulps of *Livistonia chinensis* contain excess of moisture and higher water soluble ash values and also contain higher water soluble extractive value.it shows that the fruit pulp of *Liviostonia chinensis* contain high amount of water constituents. The microscopic diagnostic characters drawn from the present investigation by using simple techniques will help in authenticate genuine samples of *fruits of Livistonia chinensis* used in various types of cancer disorders. This is a first such report on the macroscopic and microscopic diagnostic characteristics and standardisation on fruit pulp of "*chinese fan palm tree*".

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