



## Pharmacognostic Evaluation of *Cocos nucifera* Linn Cotyledon [Coconut Apple]

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### ABSTRACT

*Cocos nucifera*, a common plant over different parts of India and tropical districts, of the family Arecaceae. It serves as an essential source of nourishment, eatable oil and normal fiber. Since negligible inquiries about are done on the coconut cotyledon, our investigate looks for to build up a intensive system on the Pharmacognosy of the coconut cotyledon. Show ponder was carried out to set up a morphological and microscopical recognizable proof of *Cocos nucifera*. Preparatory Phytochemical screening on diverse extricates like watery, ethanol, petroleum ether, benzene, chloroform appeared the nearness of carbohydrates, amino acids, proteins, auxiliary metabolites such as alkaloids, tannins and flavonoids. Physical assessment such as fiery remains esteem, extractive esteem, misfortune on drying, swelling file and frothing file were determined.

**Keywords:** *C.nucifera*, Cotyledon, Embryo, Coconut, Pharmacognosy.

### INTRODUCTION

Coconut embryos and coconut apples have various wellbeing focal points. The coconut fetus and coconut apple are not precisely alike. The coconut water interior the shell dynamically concentrates and advances the creation of a structure known as the coconut apple or growing coconut. Because of its tall protein substance, it is utilized as a consumable component in refreshments, sweets, and other dishes. The coconut cotyledon is the to begin with leaf-like structure that rises from the coconut fetus. The cotyledon is the coconut's most punctual photosynthetic organ and serves a critical part in setting up the seedling's dietary working, inevitably giving rise to the to begin with veritable takes off. The coconut cotyledon is encompassed in the coconut fetus and secured by the cotyledon sheath. The tegmen and endosperm offer assistance the developing life develop and create. The developing life passes through different stages of improvement some time recently seed germination and plant recovery. The surface of coconut fetus is small recorded since to their fragile and delicate structure. More investigate is required to give specific data almost the surfaces of coconut fetus and apples. In this way, our think about tries to unwind the fragile viewpoints of coconut developing life structure and pharamcognostic profile of coconut apple.

### Materials and methods

#### 1. Collection

Coconut apple were collected from its local sites around Trivandrum .The coconut shells were carefully opened to retrieve the embryo and cotyledon.

#### 2. Authentication

Authentication was done at the Department of Botany, University Of Kerala, Karyavattom.

#### 3. Morphological Evaluation

It involves determining the shape, size, odor, structure of the coconut apple.[6]

#### 4. Microscopic Evaluation

It involves determining the transverse section of coconut embryo using phloroglucinol and saffranin stain.[6]



## 5. Physical Evaluation

### Determination of Total Ash value

Weighed about 3g of dried powdered sedate in a tarred silica pot. Presently burn the medicate by continuously expanding the temperature, until free from carbonaceous material. The residue obtained will be white or grayish white color. Presently cool and weigh. Calculate the rate of ash with reference to discuss dried medicate.

### Determination of Acid Insoluble Ash Value

Boil the total ash with 25ml of dil. HCl for 5 minutes. Filter it. Wash residue using hot water and ignite using muffle furnace .cool and keep in desiccators .Weigh and calculate the ash with reference with discuss dried sample.

### Determination of Water Soluble Ash Value

Boil the total ash with 25ml water for 5 minutes. Filter. Wash the buildup with hot water and ignite .cool and keep in desiccators' .Weigh the ash, calculate the water soluble ash with reference to dried sample.

### Determination of Extractive Value

Alcohol soluble extractive value

Macerate around 5g precisely weighed powder dried rough sedate with 100ml of 90% alcohol in stoppered jar, for 24 hours and was shaken habitually for 6hrs and stand for 18 hrs.at that point extricate was sited through filter paper. Dissipate 25 ml of filtrate at 100 C.kept in desiccators and weighed .calculate rate w/w of alcohol solvent extricate with reference to dried drug.

### Water soluble extractive value

Macerate around 5g powdered crude drug with 100ml of chloroform water in stoppered jar, for 24 hours. It was shaken habitually for 6hrs and stand for 18 hrs .At that points extricate was sited through filter paper. Dissipate 25 ml of filtrate at 100 C.kept in desiccators and weighed .calculate rate w/w of alcohol solvent extricate with reference to dried drug.

### Determination of Percentage of Water Content (Toluene Distillation)

Introduce 200ml of toluene and 2ml of water into dry beaker .Add many pieces of pervious demitasse and hart for 15 minutes. Distill at arate of 2drops per second until utmost of the water has distilled, also increase the rate of distillation as the water has been fully distilled .wash the inside of the condenser tube with toluene R .Continue distillation for further minutes, remove the heat allow the tube to dislodge any driblets of water clinging to the walls of entering tube .allow the water and toluene sub caste to separate and read off the volume of water .calculate the amount of water.

### Determination of Swelling Index

Accurately weigh 1 gm of sample in 25ml glass stoppered measuring cylinder. Add 25ml of water and shake thoroughly every 10 minutes for 1 hr. Allow to stand for 3 hrs. Measure the volume in ml occupied by the plant material, including any sticky mucilage.

### Determination of Foaming Index

Weigh 1 gm of the plant material and transfer into 500 ml conical flask containing 100 ml of boiling water. Boil for 30 min .cool and filter into 100 ml of conical flask .add sufficient water to dilute the volume. Pour the decoction into 10 stoppered test tubes and undergo serial dilution with water up to 10 ml. Shake for 15 sec and allow standing for 15 min .Measure the height of the foam.

## 6. Preliminary phytochemical evaluation

Preliminary evaluation of primary and secondary metabolites in embryo will be carried out as per the Practical Pharmacognosy by Dr.K.R.Khandelwal.[5]

## RESULTS

### 1. Collection

#### Plant Profile

Kingdom : Plantae

Family :Arecaceae

Genus : Cocos

Species :C.nucifera

Geographical source : India, Srilanka, Malaysia

Odour : sweet and nutty aroma

Plant type : evergreen

Flowers : small, yellowish, white

Fruit : drupe

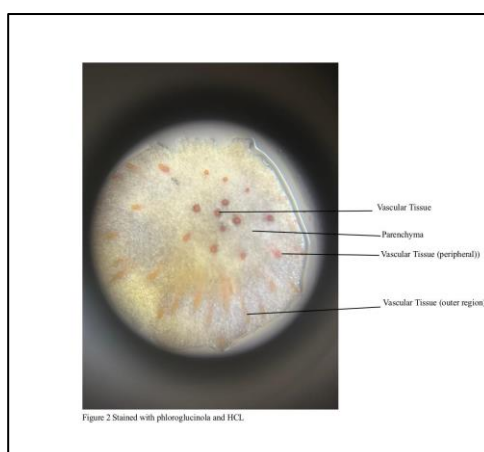
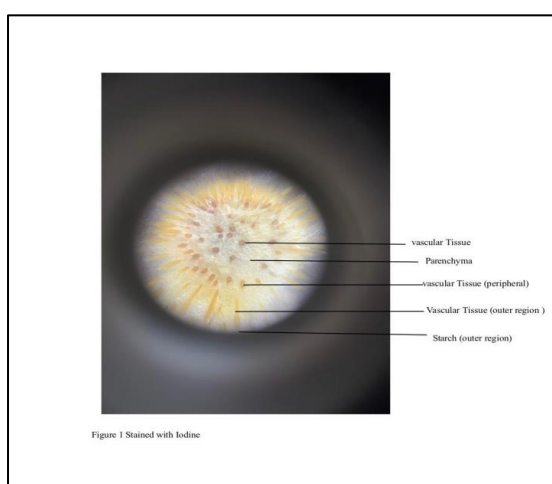
Temperature : 24-7C

Humidity : 60-80%

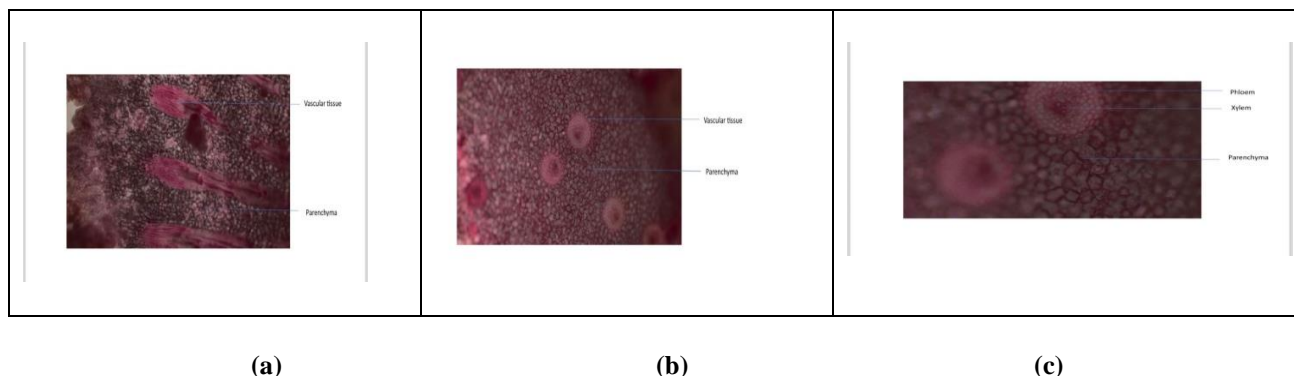
### 2. Morphological evaluation

The coconut cotyledon or apple is white, yellowish creamy, fluffy cotton like texture which offers a sweet juicy favor that is delicious and nourishing. .the coconut embryos are encased by testa, tegmen and endosperm. These layers provide protection and nutrients.

### 3. Microscopical evaluation



**Table no.1: Transverse section of embryo**



The central portion embryo stained with phloroglucinol and HCl in figure (2) shows 4-5 vascular tissue embedded in white color spongy parenchyma. It appears as a scattered rim as shown in figure(b) . Vascular tissue contains three xylem vessels enclosed within the phloem in figure(c). The peripheral region shows radially arranged vascular tissues that extend up to 2-3 layers. In the outer region vascular tissue appears as elongated fiber shown in figure(a) The vascular bundles are surrounded by parenchyma, expanded outwards to form a spongy texture like structure .The parenchyma which is present in the outer region is filled with starch grains shown in figure(1).

**4. Physical evaluation**

**Table no.2: Result of ash value and extractive value**

Ash value			Extractive value	
Total ash	Water soluble ash	Acid insoluble ash	Alcohol soluble	Water soluble
2.43(±0.01)	5.18(±0.48)	2.76(±0.47)	22(±0.57)	12.4(±1.70)

**Table no.3: Result of swelling index and foaming index**

Swelling index	Foaming index	Percentage of water content
Absent	Absent	2.17

**5. Preliminary phytochemical evaluation**

**Table no.4: Result of phytochemical evaluation**

Chemical test	Aqueous	Ethanol	Petroleum ether	Chloroform	Benzene	Coconut water
Carbohydrates	+	+	+	+	+	+
Proteins	+	+	+	+	+	+
Amino acid	+	+	-	-	-	-
Gums	+	+	-	-	-	-
Mucilage	+	+	+	+	+	+
Alkaloids	+	+	+	+	+	+
Tannins	+	+	+	+	+	+
Phenolic compounds	+	+	+	+	+	+
Flavonoids	+	+	+	-	-	+
Cardiac glycoside	-	-	-	-	-	-
Saponin glycosides	-	-	-	-	-	-
Anthraquinone glycosides	-	-	-	-	-	-
Minerals	-	-	-	-	-	+
Enzymes	+	+	+	+	+	+



Organic acids	+	+	+	+	+	+
Vitamins	-	-	-	-	-	-

## Discussion

The testa or outermost layer provides protection to the embryo. The tegmen and endosperm supports the growth and development of embryo. The coconut embryo nestled within the coconut endosperm comprises of the radical (primary root, cotyledon, plumule (shoot apex) hypocotyls and epicotyls. As the embryo matures the radical extends downwards to anchor the plant while the cotyledon unfurls as the inaugural leaf, the plumule develops into stems and leaves and is connected by the hypocotyls. The epicotyls produce the first leaves.

The vascular tissues present in the periphery and outer region grows into fibrous roots and the vascular tissue in the central portion may develop into a leaf.

The ash value, extractive value, swelling index, foaming index and percentage of water content of coconut apple provide valuable insights into extract quality and composition. These findings will inform further research and development of the related product. This part shows that the coconut water contain rich amount of minerals whereas the coconut apple lacks minerals. As the embryo matures in coconut water, it transforms most of the surrounding constituents to support its development.

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