PHYTOCHEMICAL ANALYSIS AND MINERAL PROFILE OF *COUROUPITA GUIANENSIS AUBL.* FRUIT - AN INDIGENOUS MEDICINAL TREE

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ABSTRACT

Medicinal plants possess therapeutic properties and provide pharmacological effect on the human or animal body. Couroupita guianensis also called "cannon ball tree" is a medicinal tree which has numerous medicinal properties. All the parts of the plants are used for therapeutic purposes. The present review gives the information about the phytochemical and mineral profile analysis of fruit of the particular plant. The results show that fruit of the couroupita contain various phytochemicals such as alkaloid, flavanoid, Terpenoid, tannin, phenolic compounds, carbohydrate, protein and saponin whereas phytochemicals such as catchin, anthraquinone, glycosides where found to be absent. Mineral analysis indicate that iron is found to be maximum and there are no harsh minerals found in the fruit. Many recent studies show that the fruit is edible but because of unpleasant smell people refuse to consume them. Fruit extract of Couroupita guianensis showed many pharmacological activities so it is used in investigations to isolate pharmacological active compounds which are useful for the production of novel drugs for various diseases.

Keywords: *Couroupita guianensis, Mineral profile, phytochemicals.*

1. INTRODUCTION

Plants are significant part of nature, all over the world 4,22,000 flowering plant species are found and in these 50,000 plants are used as medicinal plants. Lecythidaceae family containing about 20 genera and 250-300 species and they are mostly distributed in South America, Africa, Asia and Australia. They are woody plants with large and showy flowers. The genus *Couroupita*

represent more than 30 recognized species throughout the world [1]. *Couroupita guianensis* is important for its medicinal uses like they are used to treat cold and stomach ache. Leaf extract is used to cure skin diseases, tree parts are used against malaria, flowers are used as a remedy for cold and intestinal gas formation also used to treat stomach ache. The fruit pulp can used to disinfect wounds and young leaves ease tooth ache[2]. *Couroupita guianensis* is a deciduous tree belonging to the family Lecythidaceae, commonly known Cannon ball tree. The tree gets its name from its heavy, brown, spherical fruits which resembles the cannon balls. In hindi it is called Kailashpati and in Telugu Mallikarjuna in tamil it is called Nagalinga pushpam. It possesses antifungal, antibiotic, antiseptic and analgesic qualities. It has large and showy flowers almost throughout the year and they are on the trunk and not in branches. It is widely distributed in many botanical gardens and they are considered as ornamental tree. Cannon ball flowers are considered as important in Buddhist culture in Srilanka. The trees were now considered as threatened medicinal plant because they over exploited for timber, human Settelement and agriculture . So it is has been enrolled in International Union for Conservation of Nature (IUCN) red list. The tree have globular woody and brown fruits which has size almost equal to an human head. weight of a mature fruit 1450 gms and size is 24 cm in diameter. Fruit contains small seeds with a white unpleasant smelling jelly.

Phytochemicals are non-nutritive in nature, which are found in plants and they have better potential in curative many diseases.The medicinal properties shown by different medicinal plants are due to the phytochemicals present in the plant. These phytochemicals are the most vital sources for the treatment of various diseases. Phytochemicals are beneficial for the increase of immunolatory responses and also provide immunity against many diseases. Plants containing numerous minerals presence of certain minerals in large quantity specifies some properties. Mineral profile test can be used to identify different mineral composition present in a plant. According to that we can assume that it is edible or toxic and also, we can identify some of their properties. Mineral analysis and phytochemical analysis are helpful for the identification of compounds and composition of substances present on it. Nowadays in many countries Malnutrition is the major threat due to mineral deficiency. Mineral like iron deficiency is higher and it affect the one third of the world[3]. By the consumption of the fruits containing adequate amount minerals help to cure the diseases which is arises due to malnutrition.

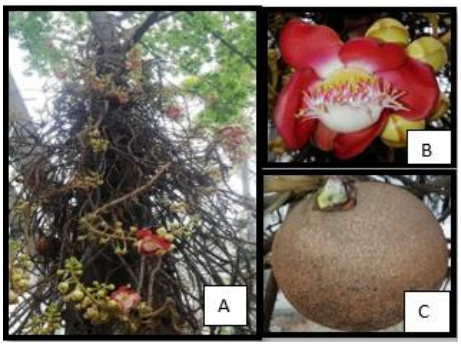

Figure 1. A -, B -Flower, C – fruit

2. MATERIALS AND METHODS

2.1 Collection

Fresh fruit of *Couroupita guianensis* was collected from college campus,nirmalacollege, coimbatore tamilnadu.

2.2 Drying

Collected fruit is cut in to small pieces and dried in shade for 2 weeks until it is very crispy for powdering. Shade drying is preferred because direct sun dry may cause the vaporization of phytochemicals present in it.

2.3 Grinding

Well dried pieces are recommonded for grinding. Grinding is performed using pulvarizer because of the hard nature of the dried specimen. Using the instrument fine powder is get and it is stored in a clean bottle for further studies.

2.4 Maceration

Extraction of sample is done using maceration technique. About 30 g of powder is taken and 100 ml of ethanol is used as a solvent both these mixed and kept in shaker for about 3 days.

2.5 Preliminary phytochemical analysis [Harborne 1998]

The major secondary metabolites like alkaloids, flavonoids, saponins terpenoids, steroids, glycosides, tannins, Anthraquinones and primary metabolites such as proteins, amino acids and carbohydrates were analysed.

2.6 Mineral profile

The minerals like potassium, phosphorous, calcium, magnesium, copper, iron was estimated by the following methods. The mineral profile of the selected medicinal plant was analysed by using standard method of AOAC, (2000).

Estimation of calcium and magnesium

5 ml of triple acid digested extract was taken in a petridish, to this 10 ml of 10% NaOH and 0.1g of Murexide indicator powder (Mixture of 40 g potassium chloride and p 10 g ammonium purpurate) were added and titrated against 0.02 N versenate (19g of EDTA was dissolved in 5 liters

of distilled water) and standardized against 0.2 N Na, CO solution and adjusted until the colour changes from red to violet.

Estimation of iron by atomic absorption spectrophotometer

Sample digestion

500 mg of air- dried was mixed with 10 ml of conc. HNO, and 4 ml of 60% perchloric acid and 1 ml of conc. H_2S0_4 and the contents were kept undisturbed overnight. After it was heated on a hot plate containing conc. H_2SO_4, in a beaker until the brown fumes ceased coming out and then allowed for cooling. After cooling, it was filtration is done using Whatman filter paper. After filtration the filtrate was made up to 100 ml with glass distilled water.

Estimation of iron

By feeding the sample to an Atomic Absorption Spectrophotometer the iron content was estimated at 246.8 nm wavelength and the readings were expressed as mg/100 of sample on dry weight basis.

Estimation of potassium

Potassium were estimated by using Flame Photometer, Model-EFL. The potassium contents were calculated by referring to the calibration curves of potassium, respectively and expressed as mg/100 on dry weight basis.

Estimation of Copper

Stock standard solution: (1) Dissolve 1.00 gm of copper metal in minimum volume of (1+1) HNO, (2) Dissolve 3.929 gm CuS04. 5 H_2O in distilled water and volume is made up to 1000 ml. It gives a solution of 1000 ppm Cu. 10 ml of this solution is diluted to 100 ml to get 100 ppm copper solution. The final standard solutions are prepared from this 100 ppm solution.

Estimation of selenium [Lichen cheng *et al.,2002*]

Around I g of powdered sample was taken for analysis. The powdered subsample was put into a high-walled beaker and mineralized with 10 mL of a 4:1 (v/v) mixture of HNO, and HCIO, at a constant 150 °C in a sand bath until the solution became colourless and clear. For reduction of Se^{6+} to Se^{4+} 5 ml of 6 mol L HCI was added to the digested solution and heated in the same thermostatic bath until the solution became colourless and clear. Then, the digested sample was allowed to cool and diluted to 25 ml with deionized water; 5 ml. of the solution was taken in a test tube, and 1 ml of concentrated HCI and 0.5 ml. of 10% K-Fe(CN) (w/w) were added: then 1 ml of mixture was autosampled into a reaction vessel. Selenium was determined using an atomic fluorescence spectrometer.

Estimation of sodium [shumalia gul and Mahpara safdar, 2009]

Na analysis of the sample were done by the method of flame photometry. The wet digested food sample solutions as used in AAS were used for the determination of Na. Standard solutions of 20, 40, 60, 80 and 100 milli equivalent/L were used for Na.

3. RESULT AND DISCUSSION

Phytochemical Analysis

The preliminary phytochemical screening of *couroupita guianensis Aubl.* Was attempted in the Study . Result obtained is shown in table 1. The qualitative chemical test for the ethanolic and hot water extracts were performed for Different phytochemical such as alkaloid , anthraquinone, flavonoid, Catchin, carbohydrate, glycoside, protein and aminoacid, Saponin ,tannin, phenolic group and terpenoid. Both the hot water and ethanolic extract contain the presence of phenolic groups ,tannin, terpenoid, protein and amino acid Saponin, flavanoid and also alkaloid and carbohydrate. It was observed hot water extract of *Couroupita guianensis* contain high content of Saponin. whereas all the other active constituents are less as compared to hot water (Table-I). Both the extract of couroupita shows the absence of anthraquinone, Catchin, and glycoside.Protein and tannin content is higher in ethanolic extract as compared to hot water extract. All the other chemical constituents are same for both extract.

A creamy white precipitate is formed it confirms the presence of alkaloid. The intensity of the compound is moderate.

A blue black colour is formed which indicate the presence of flavanoid.. Carbohydrate presence is indicated by the formation of a reddish violet ring at the junction between the liquids. Xanthoprotic test were done and a yellow coloured solution is formed which confirmed the presence of protein. Persistent foam formation when distilled water added can be the indication of Saponin . Presence of tannin is confirmed by the indication of blue black colour . Phenolic group presence also indicated by blue black coloration. Terpenoid is also present in high intensity.

Alkaloids posses diverse and essential biological function in humans. In plants the alkaloid is helpful for the germination of seeds. Flavanoids are helpful to reduce the toxicity because they are considered as powerful antioxidant properties in this plant flavanoids is present in higher quantity help to protect them from toxic substances . Tannins act as plant defensive agents, protect trees from fungi, pathogens, insects and herbivorous animals .The anti-inflammatory effects of tannins help to control all indications of gastritis, esophagitis, enteritis, and irritating bowel disorders. Phenol is used as counter remedies for sore throats. In this present study it seen in higher concentration. Carbohydrate is also present in high concentration so we want to check the edibility of the fruit.

Table 1. PRELIMINARY PHYTOCHEMICAL ANALYSIS OF *COUROUPITA GUIANENSIS*

S. No	Phytochemical	Ethanol	Hot water

1.	**Alkaloid**	++	++
2.	**Anthraquinone**	-	-
3.	**Flavonoid**	+++	+++
4.	**Catchin**	-	-
5.	**Carbohydrate**	+++	+++
6.	**Glycoside**	-	-
7.	**Protein**	+++	++
8.	**Amino acid**	+++	++
9.	**Saponin**	+	++
10.	**Tannin**	+++	++
11.	**Phenolic groups**	+++	+++
12.	**Terpenoid**	+++	+++

Mineral analysis

Mineral profile analysis shows that in the fruit of *Couroupita* iron content is more as compared to other minerals. Sodium and Potassium in moderate quantity (Table-II). Whereas the other minerals like selenium and magnesium and calcium present in less amount. Ca is needed in large amounts by all plants for the formation of cell walls and cell membranes. Mineral profile of *Couroupita* guianensis was tabulated in the Table-II.

Table 2. Mineral profile analysis of couroupita guianensis

S. No	Name of the minerals	100g/mg
1.	**Copper**	**1.37**
2.	**Iron**	**48.65**
3.	**Selenium**	**1.5**
4.	**Magnesium**	**2.7**
5.	**Sodium(Na)**	**13.2**
6.	**Potassium**	**10.8**

7.	**Calcium**	**1.63**

4. CONCLUSION

From the present study, we can conclude that, presence of phytochemicals can be used for health benefits because they are highly useful for the curation of several diseases. So this work is highly recommended for in drug discovery like fields and the study of mineral analysis shows that there is no harsh minerals found and the basis we can predict the edibility of the fruit also. Thus, *Couroupita guianensis* fruit can be consumable to meet mineral deficiency in all age groups. Especially, iron content was found to be high in this plant which add an additional benefit in treating anaemia. In future, isolation of phytochemicals and animal studies were need to know the possible pharmacological action of this fruit.

4. ACKNOWLEDGEMENT

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