

Original Research Article

PHYTOCHEMICAL AND PHARMACOLOGICAL EVALUATION OF YELLOW AND GREEN VARIETY OF *COCUS NUCIFERA* WATER

ABSTRACT: Coconut water widely consumed as a health drink by people around the world. This led to an urge to study various properties of *cocus nucifera*. We evaluated anti oxidant and phyto chemical constituents of two variety of coconut the yellow and green variety. Photochemical assays showed the presence of terpenoids, alkaloids, resin, sugars, steroids, glycosides and tannins in both the dwarfs but yellow variety showed more amount of photochemical constituents. In both the variety of coconut water antioxidants were found. The assay of DPPH, scavenging of nitric oxide assay and scavenging of hydrogen peroxide assay proved the presence of antioxidants against the standard ascorbic acid but yellow variety was found to be more potent antioxidant.

All assays proved yellow dwarf was healthier than green dwarfs with more health benefits and medicinal properties.

KEYWORDS: antioxidant activity, ascorbic acid, *cocus nucifera*, phytochemical

INTRODUCTION

Cocus nucifera (L) which belongs to the family of arecaceae and is normally named as "coconut tree", the utmost naturally wide spread fruit plant on earth. It is popularly known as coconut, coconut of the beach. This plant has originated from south East Asia and islands between Indian and Pacific Ocean. Coconuts are used for their wide variety of uses in food, cosmetics etc. [1]

Coconut water is a characteristic, sans fat beverage. Low in sugars and calories, it is plentiful in fundamental electrolytes and nutrients. Named the "liquid of life", coconut is ok for everybody to drink straight from the nut. As the Hawaiians say, coconut water is "dew from the sky".

When the coconut is opened, coconut water starts to lose its supplements and flavors. This is somewhat because of normally happening chemicals found in coconut water. At the point when peroxidase (POD) and polyphenol oxidase (PPO) come into contact with oxygen, responses cause healthful and flavor misfortunes.

The coconut water is an opalescent fluid found in the shell of the coconut organic product. It is sterile and utilized as a reviving beverage. The coconut is known for its numerous temperances. It is known to be a force to be reckoned with of medical advantages. It assists with treating numerous sicknesses like throat diseases, tapeworms, gonorrhea, stomach related issues, flu, lice, giardia, bronchitis, and numerous different illnesses. It supports the safe framework and has antifungal, antiviral, hostile to parasitic and antibacterial properties.

The coconut can be devoured under different structures, like the crude coconut, the coconut oil, the coconut milk, the coconut margarine, the coconut water and so forth. It improves the insulin discharge in the body and lifts the usage of blood glucose. Indeed, the coconut utilization additionally assists with controlling diabetes by emphatically affecting the chemicals that control glucose in the body [2].

Because of this, the ascent in glucose levels delayed down and this likewise assists with bringing down the glycaemic longings of an individual. The coconut is likewise known to cause fast processing and emphatically affects different side effects that are related with gut and stomach related problems. It is additionally known to assist with the ingestion of supplements and minerals in the body, while likewise giving the quantity of dietary filaments that your body needs. The utilization of coconut, by its rich substance in fiber, eases the weight on the pancreas, adding to the lessening of the diabetes hazard. As of late, the coconut water has become an extremely stylish refreshment [3].

Among the known organic capability of plants, the cancer prevention agent action is of expanding interest. This is because of the significant pretended by the cell reinforcement compounds, found in plants and their natural products, in the treatment and counteraction of oxidative pressure sicknesses. What's more, fluids from certain natural products, for example, citrus natural product, grape squeeze, and dark grapes have these equivalent cell reinforcement properties. These substances, albeit not having a place with any gathering of regular substances, perform numerous capacities in the body [4].

Would sugars extricated from coconut water be wellsprings of phytochemicals fit for initiating cancer prevention agent movement? The premium of this action is that it comprises an enemy of cancer-causing source, as it has been exhibited tentatively and epidemiologically by Pamplona. Sugars of the coconut water being gotten from coconut organic product; it appeared to us ideal to test their arrangement in non-nutritive substances. This examination plans to assess the phytochemical compounds and pharmacological properties of coconut water.

MATERIALS AND METHODS:

COLLECTION:

Coconuts were collected from same tree one is yellow dwarf tree and another was green dwarf tree from Mangalore, India.

These varieties were harvested when the fruits begins to mature as the content of *Coccus nucifera* water will be more at this time.

Many coconut from both variety were opened and water was removed and filtered and was stored in sterile bottles in -20 refrigerator.

These samples were further analyzed for phytochemical and anti-oxidant investigation.

PRELIMINARY QUALITATIVE PHYTOCHEMICAL INVESTIGATION:

Coccus nucifera water was subjected to qualitative phytochemical examination for characterizing the active constituents present in it. The tests were carried out by standard methods. [6]

Test for Alkaloids:

A) Dragendorff's test :

Coccus nucifera water was taken (2ml), distilled water (5 ml) was added, to which hydrochloric acid (2M) was added for the reaction to occur. 1ml of Dragendorff's reagent was added to the above liquid and the visual observed for orange-red color precipitate formed detects alkaloids are present.

B) Hager's test:

Take coconut water about 2 ml in a clean dry test tube later add haters solution a clear observation of yellow precipitate tell alkaloids are present in it

C) Mayer's test:

Take 2 ml of coconut water of both variety in a test tube then add Mayer's reagent drop wise to the test tube. A pale yellow precipitate observed confirms the presence of alkaloids.

D) Wagner's test:

Cocus nucifera water (2ml) was taken; 1.5 ml of hydrochloric acid was added, later in the test tube Wagners reagent was put drops wise a buff colored precipitate clearly indicates that alkaloids are present.

Reducing sugar tests:

A) Molisch test:

Few drops of freshly prepared alcoholic α -naphthol (20%) was added to 2ml of Cocus nucifera water, later on the sides of the test tube put 2 ml of concentrated sulphuric acid this is because a layer will be formed bellow the mixture. The presence of carbohydrates was indicated by the formation of violet-red ring . The ring on addition of more amount of alkali will not be seen.

B) Benedict test:

Few drops of Benedict's solution was added to the Cocus nucifera water and heated for five minutes. A brick red color seen will detect the presence of carbohydrates .

C) Fehling test :

Cocus nucifera water (2 ml) was mixed in 10 ml of distilled water and 1ml of Fehling's solution A and B . A brick red color seen tells the presence of reducing sugars.

D) Tollen test :

Cocus nucifera water (2 ml) was added to 10 ml of distilled water. To this 1ml of Tollen's reagent was added and heated on a water bath. The formation of black precipitate with silver mirror on the sides of the test tube confirms the presence of reducing sugars.

Test for Flavonoids:

Shinoda test :

Cocos nucifera water was added in ethanol (5 ml) and to this dilute HCL about ten drops was added. A small piece of Mg was added and then it was heated. The presence of flavonoids was confirmed by red brown color.

Test for Saponins:

Emulsion test:

In a test tube containing 5ml of *Cocos nucifera* water a drop of sodium bicarbonate solution was added, shaken well and left for 3 min. Formation of honeycomb like froth confirmed the presence of saponins.

Test for Tannins:

To 2ml of *Cocos nucifera* water added in distilled water, 2ml of lead acetate was added. Formation of white cloudy precipitate confirmed the presence of tannins.

Test for Steroids:

a) Libermann-Burchard test:

About 2ml of the *Cocos nucifera* water was dissolved in acetic anhydride. The solution was heated and cooled, then add along the side of the testtube concentrated sulphuric acid . appearance of green colour confirms steroids are present.

b) Salkowski test:

In a test tube take coconut water mixture with chloroform to this solution put concentrated sulphuric acid along the sides of the test tube. In chloroform layer a red color is seen which confirms steroids in the solution.

Test for Proteins

a) Biuret's test

Cocos nucifera water (1 ml) was taken, few drops of copper sulphate solution (10% w/v) was added and then heated. A violet red color formed detects proteins in the sample .

b) Millon's test

To 1ml of *Cocos nucifera* water ,Millon's reagent (few drops) was added. A white color precipitate which becomes red on heating shows proteins in the sample.

Test for Triterpenoids:

a) Libermann-Burchard's test

2 ml of the *cocos nucifera* water of the plant material was added in acetic anhydride. The solution was heated and cooled, after which concentrated sulphuric acid (1ml) was added along the sides of the test tube. The presence of triterpenoids was confirmed by the formation of pink color.[7]

EVALUATION OF ANTIOXIDANT ACTIVITY OF COCUS NUCIFERA WATER:

DPPH RADICAL SCAVENGING ACTIVITY

The radical scavenging activity of coconut water will be determined by was determined by DPPH free radical assay with some modification . coconut water or both variety were taken in a test tube 50 μ L of coconut water in ethanol were added to 5 mL of 100 μ M solution of DPPH.

This mixture was incubated for 30 min after this readings were taken at 517 nm . A blank reading was taken by methanol and the percentage inhibition activity was evaluated by the equation given below

$$\% \text{ Inhibition} = [(A_0 - A_1) / A_0] \times 100 \dots (i)$$

Where A_0 is the control absorbance and A_1 is the coconut water absorbance. Here ascorbic acid was used as a standard. All the readings were performed in triplicates.[8]

NITRIC OXIDE RADICAL INHIBITION ASSAY (NO°)

The inhibition of NO° can be estimated by the use of Griess Illosvoy reaction .[9] In this investigation, Griess Illosvoy reagent was modified using 0.1% of naphthylethylenediaminedihydrochloride instead of 5% 1-naphthylamine. The absorbance of solutions was measured at 540 nm against the corresponding blank solutions using the following formula:

$$\text{Nitric oxide radical scavenging} = \frac{A_{\text{blank}} - A_{\text{sample}} \times 100}{A_{\text{blank}}}$$

SCAVENGING OF HYDROGEN PEROXIDE:

A hydrogen peroxide solution was prepared as phosphate buffer solution at pH 7.4. 1 mL of sample and standard was added to methanol which was mixed with hydrogen peroxide 2 mL (PBS). After 10 minutes the absorbance at 230 nm)was measured. Readings will be done in triplicates and the inhibitory concentration was calculated using equation (i) as represented above.)[10]

RESULTS AND DISCUSSION:

Table 1: Results of preliminary phytochemical analysis of yellow and green variety

Sl no	Tests	Observation	Yellow	green
1	Alkaloid a) Dragendroff test b)Hager test c)Wagner test d) Mayer test	Brick red precipitate Yellow precipitate Reddish brown precipitate Milky precipitate	+++ +++ +++ +++	++ ++ ++ ++
2	Reducing sugar a)Molisch test b)Benedict test c)Fehling test d)Tollen test	A brown coloration observed the interface Yellow to bright precipitate Presence of a brick red precipitate Silver precipitate	+++ +++ +++ +++	++ ++ ++ ++
3	Flavonoids a) Shinoda test	No reddish color	---	--

4	Saponins Emulsion test	Emulsion formed	++	+
5	Tannins lead sub acetate test	Presence of cream gelatinous precipitate	+++	++
6	Steroids a)Liebermann-Burchard test b) Salkowski test	Green blue color	+	+
		Bluish red to purple color	+	+
7	Proteins a)Biuret test b)Millon's test	White precipitate Protein present	++	+
		White precipitate Protein present	++	+
8	Tri terpenoids a)Liebermann Burchard	Light green to dark green color	+	+

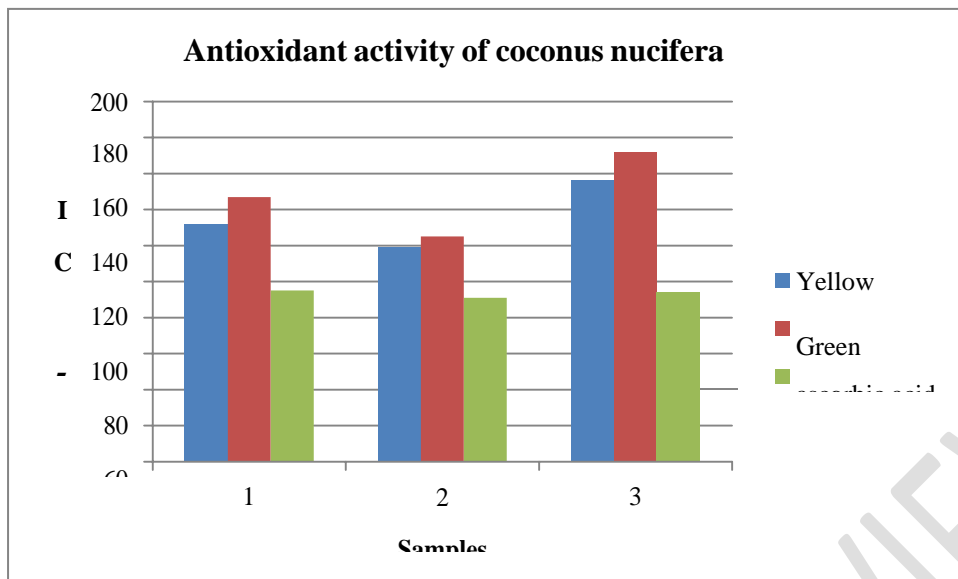
– Absent+ precipitate observed in low concentration ++ Precipitate observed in moderate concentration+++ Precipitate observed in high concentration

In phytochemical screening of coconut water Alkaloids and reducing sugar were abundant in yellow variety as checked against green variety . Flavanoids were absent in both the species. In the view of saponins tannins and steroids were also seen in higher percentage in yellow variety. Proteins and tri terpenoids were also more in yellow coconut water. Overall the results proved phytochemicals constituents responsible for majority of antioxidant and healing properties were more in yellow variety then in green variety of *Cocos nucifera* L

Table 2: Results of antioxidant analysis of coconut water

Name of the compound	Name of the extract and part	IC ₅₀ values		
		DPPH (µg/ml)	Nitric oxide radical inhibition assay (µg/ml)	Scavenging Of Hydrogen Peroxide
Coconut water	Yellow	132	119	156
	Green	147	125	172
Ascorbic acid		95	91	94

Figure no 1: Antioxidant activity od coconut water



In DPPH, nitric oxide and hydrogen peroxide assay shown in Table 2 and figure 1 when IC 50 value were compared of both yellow and green variety as compared to standard ascorbic acid. Yellow variety shows 132, 119, 156 $\mu\text{g/ml}$ as compared ascorbic acid 95, 91, 94 $\mu\text{g/ml}$ which shows comparable results in antioxidant property.

CONCLUSION

From the study it is concluded that both the coconut varieties revealed phytochemical constituents but in yellow coconut showed better results as compared to green coconut. macronutrients like proteins carbohydrates were also more in yellow dwarf than in green dwarf. The Pharmacological activity of both the fruits had promising anti oxidant activity but yellow coconut water showed better activity than green variety. The comparative results of both varieties proved yellow dwarf a good antioxidant with abundant of phytochemical constituents which will be a promising aspect useful for treatment of various ailments in terms of nutritional supplement.

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