



ISSN: 0976-3376

Available Online at <http://www.journalajst.com>

ASIAN JOURNAL OF
SCIENCE AND TECHNOLOGY

Asian Journal of Science and Technology
Vol. 08, Issue, 12, pp.7126-7128, December, 2017

RESEARCH ARTICLE

NUTRITIONAL ANALYSIS AND PRESERVATION OF TENDER GREEN COCONUT WATER

*Sharma Garima, Mishra Sunita and Daniel Madhvi

Department of Food and Nutrition, School for Home Sciences, BBAU, Lucknow

ARTICLE INFO

Article History:

Received 24th September, 2017
Received in revised form
17th October, 2017
Accepted 05th November, 2017
Published online 30th December, 2017

Key words:

Antimicrobial Activity,
Anti-thrombotic Activity,
Antioxidant Activity

ABSTRACT

Water is essential for life. There are a variety of trace elements present in virtually all potable water, some of which play a role in metabolism. For example, sodium, potassium and chloride are common chemicals found in small quantities in most waters. Tender green coconut water is a pure and nutritious beverage in the natural state. Green Coconut water refers to the liquid endosperm of a tender coconut at an age of approximately 9 months from time of pollination, the period before the solid endosperm or white meat forms. Green coconut husk is an excellent package for the water which contains sugars, minerals, amino acids, electrolytes and vitamins. Tender green coconut water was preserved by adding preservative such as potassium metabisulphate, and citric acid. This Sample of coconut water were preserved approximately 2 month in refrigerator for their shelf life study. One preserved tender green coconut water bottle sample was going for testing in RFRAC (Regional Food Research & Analysis Centre) for minerals analysis. Potassium content present in tender green coconut water after preservation is comes out to be 244mg/100g. Also, sodium content present in green coconut water comes out to be 103mg/100g.

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INTRODUCTION

Tender coconut plays an important role in maintaining the sodium, potassium, and maintaining and balancing the body. The term coconut refers to the seed or the fruit of coconut palm (*Cocos nucifera*). *Cocos* is a monotypic genus of the family Arecaceae. The ideal growing conditions for coconut palms include free-draining aerated soil often found on sandy beaches, a supply of fresh groundwater, humid atmosphere, and temperatures between 27°C and 30°C. Green Coconut water refers to the liquid endosperm of a tender coconut at an age of approximately 9 months from time of pollination, the period before the solid endosperm or white meat forms. Green coconut husk is an excellent package for the water which contains sugars, minerals, amino acids, electrolytes and vitamins. The electrolyte and mineral balance makes tender coconut water suitable as a sports drink. However, it is very sensitive to deterioration and the water is unsuitable for drinking after a day or so due to external contamination by microorganisms and oxidation because of which it loses most of its sensory and nutritional characteristics.

COMPOSITION

Chemical analysis reveals that in every 100 grams of the kernel there are 4.5 grams of protein, 41.6 grams of fat, and 13 grams of glucose, besides several kinds of minerals like calcium, phosphorus and so on.

*Corresponding author: Sharma Garima,
Department of Food and Nutrition, School for Home Sciences,
BBAU, Lucknow.

Green Coconut contains enzymes, such as invertase, oxidase and catalase that reduce hydrogen peroxide. Fresh kernel contains nitrogenous substances, fat, lignin, ash, palm sugar (glucose and cane sugar) and inorganic substances. The coconut milk contains sugar (mannitol), gum, albumen, tartaric acid and mineral water. The ashes from the leaves contain a high proportion of potash. Coconut oil comprises free caprylic acid, and also such glycerides like lauric, myristic, palmitic and stearic acids.

SPECIFIC CURES: Urinary disorders, Tri-dosha relief and Acidity, Cataract, Loss of consciousness and mental confusion, Gastrointestinal diseases, Cough, Headaches and Pain in the chest, Pregnancy, Skin problems, Affliction of luv or hot wind, Mal-absorption, Injuries, Wounds and Burn, Breathlessness, Piles, Throat inflammations, Oral diseases, Ear Problems, Massage.

MATERIALS AND METHODS

Collection of TCW: Fresh Tender green coconut were collected from local market of lucknow, Uttar Pradesh for the study. Coconut water was preserved at -4°C in a refrigerator (Lab refrigerator, BBAU).

Preservation of Coconut water in glass & plastic bottles

Tools: Measuring glass, Measuring spoon, Preservatives (Potassium metabisulphate, Citric acid, Ascorbic acid), Glass bottles, Plastic bottles, Coconut water, Coconut meat, Knife, Limca, Sugar etc.

Procedure: Preservation in Plastic Bottles

- Measure 170ml tender coconut water And 70ml limca for enhancing flavour.
- Coconut cream cut in small pieces and Add 5 gm in bottle.
- Adding preservatives (potassium metabisulphate 0.015ml, Ascorbic acid – 0.05ml and citric acid-0.04ml)
- Pore in a bottle through measuring glass.



Fig.1. Mention below shows green coconut water preservation in plastic bottle for shelflife study

Preserve tender green coconut water bottles in refrigeration for shelflife study

Nutritional and Physiochemical Analysis

Determination of minerals percentage

Determination of mineral content

Determination of ash content

Apparatus required

- Dried silica crucible
- Spatula
- Muffle furnace

Procedure

- Weigh accurately about 5gm of the sample in a predried porcelain or silica crucible which have been weighed previously.
- Place the sample in a muffle furnace for 5 hrs at temperature of 550 – 560 degree Celsius.
- Take out the Sample after 3 hrs and keep it in desiccators for 30 min to cool it down.
- Now again weigh the sample present in ash form after being in furnace.

Formula used – Total ash content (on dry basis) = $\frac{w_2 - w_1}{w_1 - w} \times 100$ Where W= weight (in grams) of the empty crucible. W1 = weight (in grams) of the crucible with sample before drying W2 = weight (in grams) of the crucible with ash.

RESULTS AND DISCUSSION

The experiment was conducted to determine the effective means of processing and preservation of Tender Coconut

Water (TCW). Coconut water was studied for their acceptability and shelf life at refrigeration temperature (4°C). The acceptability and shelf life were evaluated through organoleptic taste testing procedure along with chemical analysis.

Preservation and storage : Fresh Tender Coconut Water (TCW) were collected from different location in lucknow market and preserved water by using preservatives like citric acid , potassium metabisulphate and ascorbic acid. Then, preserved coconut water in plastic bottles and glass bottles for shelflife study. Storage temperature should be 4 °C or below. Bottles kept in a refrigeration temperature for 3-4 month in refrigeration and should be maintain the refrigeration temperature, properly. After 4 month , both plastic and glass bottle were observed and concluded that glass bottle preservation was better than plastic bottles . The sensory quality profile of coconut water is a prime factor to consider the marketability of preserved product. During storage, it was observed that Overall sensory quality profile of coconut water slightly acceptable. Glass bottle were better as compar to plastic bottle like flavour, texture, appearance, colour etc.

Preservation of tender green coconut water

Preserve tender green coconut water by adding preservative such as potassium metabisulphate, and citric acid. This Sample of coconut water were preserved approximately 2 month in refrigerator for their shelflif study. One preserved tender green coconut water was going for testing in RFRAC (Regional Food Research & Anaysis Centre) for minerals analysis:

Mineral analysis

Potassium content in preserved tender coconut water bottles
Sodium content in preserved tender coconut water bottles

Test results of tender green coconut water bottle preservation from rfrac testing comes out to be

Table 1. Results of preserving coconut water from rfrac

| S.No | Parameter | Results | TEST METHOD |
|------|--------------------|---------|-------------|
| 1 | Potassium, mg/100g | 103 | AAS Method |
| 2 | Sodium, mg/100g | 244 | AAS Method |

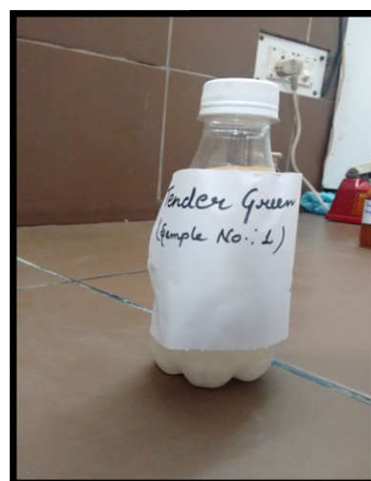


Fig. 2. Sample of tender coconut water for rfrac testing analysis

Determination of mineral content

- Potassium content present in tender green coconut water after preservation is comes out to be 244mg/100g. The preservation of green coconut water was done before 2 month in plastic and glass bottle for shelf life study. The nutritive value comes out to be 244mg/100g.
- Also, sodium content present in green coconut water after 2 month of preservation in refrigeration temperature (4°C) is comes out to be 103mg/100g.
- If compare both the result from the fresh green coconut water is shown that mineral content is higher in fresh tender green coconut as compair to packed and preserve tender green coconut water. But, Nutritive Values of tender green coconut water is not that much affected after preservation for 2 month.

Summary and Conclusion

Result & discussion chapter in any research work must be compile with summarization & conclusion section.

Table 2. Nutritive value of tender green coconut water and coconut white after testing in rfrac (regional food research and analysis centre), comes out to be mention in a table below:

| S.No. | Parameters | Results | Test method |
|-------|--------------------|---------|-------------|
| 1 | Potassium, mg/100g | 103 | AAS Method |
| 2 | Sodium, mg/100g | 244 | AAS Method |

Characterisation of nutritional profile of tender green coconut water and coconut white- The protein content is higher in coconut meat is 2g than the coconut water(0.7g) per 100 g of the sample weight. The total energy of coconut meat is 467.0 cal and coconut water 19 cal in whole coconut.

Mineral content present in preserved tender green coconut water comes out to be Mainly, Good Potassium and Sodium content present in coconut water as a electrolyte. It is rich in antimicrobial and antioxidant properties. Also have antithrombotic activity in tender coconut water. Calcium, Iron, Magnesium minerals are rich In pattli jaggery which inances the nutritive value of the products prepare by coconut.

Preservation of tender green coconut water: Adding Potassium meta-bisulphate, Citric acid in appropraite amount by using measuring spoon and store in refrigerator at 4⁰ C for shelf life study. In study, observed that, around 2 month, coconut water quality not that much affected and it could be consumable. Overall acceptability of preserved coconut water bottles is good.

Storage: Preserved coconut water bottle kept in refrigerator temperature 4⁰ C for 2-3 month for shelflife study. Before storage, proper packaging and labelling should be done. Then, check the acceptability and quality of tender green coconut water preserved in glass and plastic bottles. Nutritive value are not much affected after storage for 2-3 month in refrigerator temperature and after testing, value comes out to be approximately same.

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