

# DATE-COCONUT DRINK: PHYSICO-CHEMICAL AND SENSORY QUALITIES

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**Abstract:** This study evaluates the nutritional and sensory qualities of Date-Coconut drink that was prepared from a combination of Date palm juice and Coconut milk. The Treatments consist of a control (A) - Date palm drink; 50% Date palm juice and 50% Coconut milk B; 25% Date palm juice and 75% Coconut milk C; 75% Date palm juice and 25% Coconut milk D. A completely randomized design model was used in the analysis of the physico-chemical and sensory qualities of the drink. The result revealed a delicious, sweet and sinks in the heart drink. The protein content was higher in the Coconut milk compared with Date juice. Conversely, the energy content of the Date juice was higher than Coconut milk. Additionally, the energy content was 332.10K.cal/g for the control (100% date palm juice); 325.22k.cal/g Treatment B; 304.79k.cal/g Treatment C; and 306.82k.cal/g Treatment D. The protein content was 2.45% Treatment A; 3.73% Treatment B; 4.36% Treatment C and 3.08% Treatment D. The fat content was also highest for Treatment C > B > D > A in that order. Highly overall acceptability was recorded for Treatments B, C and D than A. Conclusively; the drink can be drank by all and sundry without and religious taboo.

**Keywords:** Dates, Coconut milk, Chemical and sensory analysis, delicious drink

## 1. Introduction

Date palm which is of genus of phoenix and family of *Arecaceae* was mentioned more than 50 times in the Bible and 20 times in the Quran. There are three main cultivars of Date palm which includes soft, semi dry and dry. The type of fruit depends on the glucose, fructose and sucrose contents. The country with the topmost production of Dates was Egypt with 1,373000.51 metric tonnes followed by Saudi Arabia with

1,122000.82 metric tonnes and Iran with 1,016000.61 metric tonnes [1].

The fruit produced is known as Dates. Dates have been a staple food of the Middle East and the Indus valley for many years. It was believed to have originated around Iraq, Arabia and the North Africa West to Morocco. Dry and soft Dates are eaten out-of-hand or may be pitted or stuffed with filling such as almond, walnuts, lemon peels, cream cheese etc. Partially dried pitted dates may be glazed with glucose syrup for use as a snack food [2]. Dates is known as Dabino in Nigeria and mostly used by the Muslim to break their fast. In Northern Nigeria, Date and pepper are added to traditional beer so as to make it less intoxicating.

The nutritional quality of Dates is well documented in literature (per 100g) energy 282k.cal/kg, protein 2.45g, fibre 8.0g, it is also rich in vitamins and minerals [3].

The health benefits of Dates include: (i). It has impressive list of essential nutrients needed for growth, development and overall well-being. (ii). It has soft easily digestible flesh and simple sugars like fructose and dextrose. (iii). The fruit is rich in dietary fibre also helps in preventing colon mucous membrane. (iv). It has moderate source of vitamin A needed for clear vision and helps in preventing lungs and oral cavity cancer. (v). the fruit contains antioxidants, flavonoids which helps to protect cells and other structures in the body. (vi). It is an excellent source of iron, potassium, calcium, manganese, copper and B-complex vitamins [4].

Coconut palm (*Cocosnucifera*) which is a member of the family *Arecaceae* found in the tropical and sub-tropical environment for decoration as well as for its many culinary and non-culinary purposes. The seed provides oil for frying, cooking and making margarines. The white fleshy part of the seed which is the coconut meat is used fresh or dried in cooking, mostly in confectionary and desserts like macaroons. Coconut milk is frequently added to curries and other savoury dishes. Coconut flour is used in baking so as to combat malnutrition; dried coconut is also used as the filling for many chocolate bars [5].

Coconut water which contains sugar, dietary fiber, proteins, antioxidants, vitamins and minerals provides an isotonic electrolyte balance [5]. Additionally, coconut water can be fermented to produce vinegar.

### 1.1 Coconut Milk

It is obtained by extracting juice by pressing the grated coconut white kernel (meat) or by passing hot water or milk through grated coconut in which the oil and aromatic compounds are extracted. It has a fat content of 24% [6]. When allowed to settle, coconut cream will rise to the top and separate from the milk. The milk can be used to produce virgin coconut oil by controlled heating and removal of the oil fraction.

Coconut oil can be used for cooking mostly for frying. It can also be used in liquid form as would other vegetable oils or in solid form as would butter or lard[3].

Coconut-inner edible solid part/raw (fresh kopra) contains; (100g) energy 354k.cal, fat,33.49g, protein, 3.33g, fibre 9g. It is also rich in vitamins and minerals [3].

### 1.2 Medicinal Uses of Coconut

Young coconut juice has oestrogen-like characteristics [7], coconut water can be used as an emergency short term intravenous hydration fluid [8]. This is due to the fact that the water has a high level of sugar and other salts that

makes it possible to be used in the bloodstream. In Pakistan, coconut is also used in the treatment of bites from rats [9, 10].

In order to solve the problem of malnutrition in Africa, it is believed that plant products which are readily available and cheap should be used to improve on the nutritional status of the populace. Hence, the thrust of this study was to formulate a nutritionally balance and delicious drink using Coconut milk and Date juice.

## 2. Materials and Methods

### 2.1 Samples

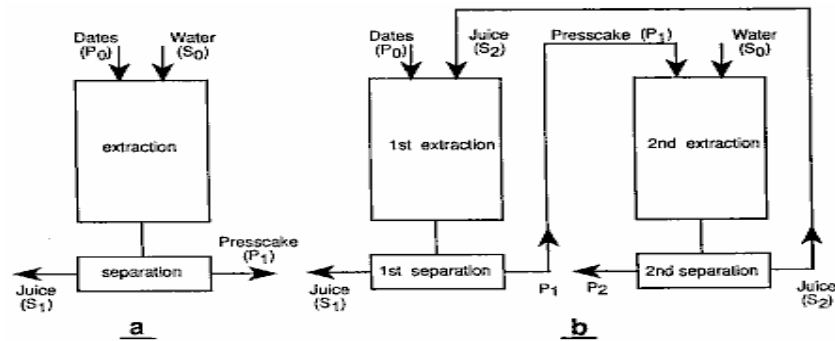
The Date and Coconut fruits were bought from a local market in Ilorin metropolis while all debris and stones were removed from the Date fruit and later washed in water ready for milling.

### 2.2 Preparation of Coconut MILK and Date JUICE

The coconut fruit was broken while the coconut meat was removed with a blunt knife. The brownish back was scraped using a sharp knife and the meat was later grated and kept in a bowl containing water (2:1). The milk was obtained by passing hot water through the grated coconut. The whole content was steamed for some few minutes so as to extract the milky colour content (Coconut milk) by sieving with 0.18mm sieve into a new bowl.

### 2.3 Date Juice:

The whole of the fruit flesh was obtained by splitting the fruit open to remove the seed. A two stage extraction described by Agriculture and Consumer Protection was employed. The date flesh/ water was blended to a fine paste and later centrifuged at 300rpm (separate the desirable from undesirable components). At the lower part of the tube, debris was collected and above it, is the date skins, fibrous particles. Above this layer is the lighter coloured layer next to this is the clear colour liquid which contains the sugar and other soluble solids and above this is the thin film of materials which may contain fat (Figure 1).



**Figure 1:** Two stage extraction method

(Source: <http://www.fao.org/docrep/>)

## 2.4 Mixing and Formulation of Date – Coconut Drink

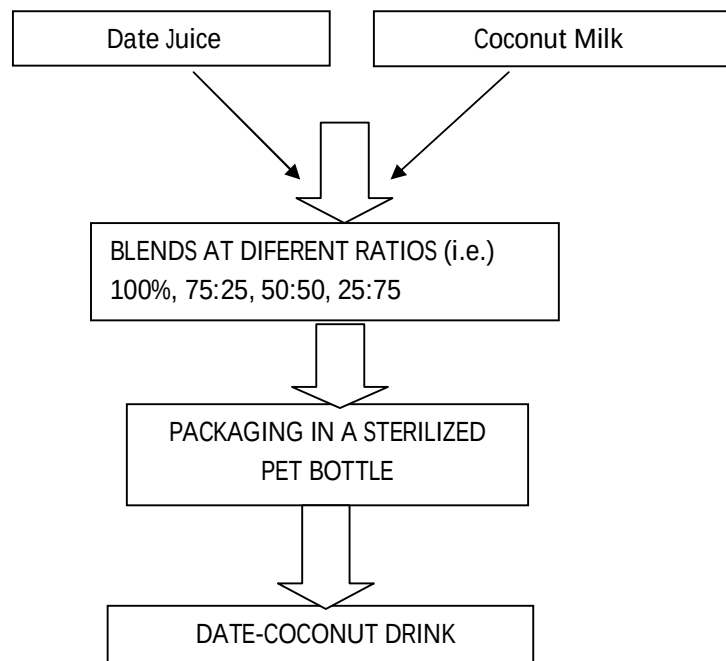
Soluble solids of Date juice was later mixed with Coconut milk in the following ratios

Treatment A (Control) -----Date juice only  
 Treatment B-----50% Date juice plus  
 50% Coconut milk

Treatment C-----25% Date juice plus  
 75% Coconut milk

Treatment D -----75% date juice plus  
 25% Coconut milk

To each of the different treatments a natural preservative was added at 5% level and there was no addition of any synthetic preservative.



**Figure 2:** Flow chart of date – coconut drink

### 3. Chemical Analysis

The proximate composition of the Treatments was determined according to the procedure described by A.O.A.C. [11] while the energy was estimated using the method of Atwater. The major and minor mineral elements were determined using Atomic absorption emission spectrophotometer (AAS) model 200A. The total carbohydrate was as described by Dubois [12]. The palatability qualities of the drinks were determined using

a 9 point hedonic scale (juiciness, flavour, colour and overall acceptability) with 9 representing like extremely and 1 indicating dislike extremely.

#### 3.1 Statistically Analysis

Data collected were subjected to analysis of variance (ANOVA) of a Completely Randomized design model while treatment means were separated using Duncan [13] multiple range test.

### 4. Results and Discussion

The chemical composition of Date juice and Coconut milk are shown in Table 1. The Crude Protein, lipid, fibre and Carbohydrate contents of the Coconut milk were: 7.50, 24.10, 3.35 and 14.30% respectively. While the total energy was 304.1 kJ/g. The calcium (mg/100g) was 38.4; phosphorus 24.0 and potassium 631.

The percentage proximate composition of the Date juice was Protein 3.05; Carbohydrate 74; lipid 2.89 and fibre 2.35. The total energy was 334.2 kJ/g while the mineral contents (mg/100g) were calcium 66; phosphorus 70 and potassium 520.

The crude protein, dry matter, lipid, fibre and energy contents of coconut milk corroborates the reports of Belew *et al.* [14], Belew and Belew [15] and Belew *et al.* [16]. The crude protein content of coconut milk was twice that of Date juice and the lipid was ten times higher than that of Date juice.

The crude protein content of Date juice noted in this study was in line with the report of El-Sohaimy and Hafez [17]. While the moisture, carbohydrate, fibre and lipid contents were

similar to the reports of El-Sohaimy and Hafez [17].

It is interesting to note that the calcium and phosphorus contents were higher in Date juice than Coconut milk. The result obtained concurs with the reports of El-Sohaimy and Hafez [17]. The pH was similar in both Coconut milk and Date juice and this shows that Coconut milk and Date juice are less acidic and could be tolerated by ulcer patients.

The percentage protein content of the Date-Coconut drink (Table 2) was 2.45(A), 3.73(B), 4.36(C) and 3.25(D). The fat content was greater for C (18.95%), B (15.39%), D (6.50%) and A (2.90%). The highest carbohydrate was recorded for Treatment A followed by B, D and C. However, the fibre content was poorest in Treatments A (2.32%) and D (2.34%) but highest in Treatments D and C. The greatest energy content was recorded in Treatment A, greater in B but least in C and D.

Table 3 shows the results of the palatability study. The taste was rated highest in Treatments B and C compared to Treatment A (Control) which was least. The flavour and juiciness followed similar trend while the colour was highest in Treatment C and least in Treatment A. Conversely, the highest overall acceptability was recorded for Treatments B > C > D > A in that order. The colour of Treatments B and C were preferred to others. Treatments with inclusion of coconut milk were rated higher due probably to stimulating odour of coconut milk which was impacted into the drink and which could have enhanced the mood of the panellists. It is worth noting that the linoleic acid and lactose of aliphatic hydrocarboxylic acid found in coconut milk will be additional nutritional benefits to be derived by consumer of the product.

### 5. Conclusions

It could be concluded from the study that a combination of 25% Date juice and 75% Coconut milk could be used as beverage by all and sundry due to its high Crude Protein, fat and energy content without any religious implication on its consumption. Hence, the high nutrient content makes the new product a perfect drink.

**Table 1** Proximate composition of coconut milk and date juice

| Composition (%)         | Coconut milk | Date juice |
|-------------------------|--------------|------------|
| Moisture                | 88.65        | 87.10      |
| Protein                 | 7.50         | 3.05       |
| Carbohydrate            | 14.30        | 74.00      |
| Lipid                   | 24.10        | 2.89       |
| Fibre                   | 3.35         | 2.35       |
| Total energy (K.cal/g ) | 304.1        | 334.21     |
| Ash                     | 0.55         | 3.15       |
| Calcium                 | 38.40        | 66.00      |
| Phosphorus              | 24.0         | 70         |
| Potassium               | 631          | 520        |
| pH 6.25                 | 6.30         |            |

**Table 2** Proximate composition of date-coconut drink

| Parameters (%) / Treatments | A                   | B                   | C                   | D                   |
|-----------------------------|---------------------|---------------------|---------------------|---------------------|
| Protein                     | 2.45 <sup>d</sup>   | 3.73 <sup>c</sup>   | 4.36 <sup>a</sup>   | 3.08 <sup>b</sup>   |
| Fat                         | 2.90 <sup>c</sup>   | 15.30 <sup>a</sup>  | 18.95 <sup>a</sup>  | 6.50 <sup>b</sup>   |
| Carbohydrate                | 73.85 <sup>a</sup>  | 43.15 <sup>b</sup>  | 29.20 <sup>d</sup>  | 59.00 <sup>c</sup>  |
| Fibre                       | 2.32                | 2.92                | 3.09                | 2.34                |
| Energy(k.cal/g)             | 331.10 <sup>c</sup> | 325.22 <sup>b</sup> | 304.79 <sup>a</sup> | 306.82 <sup>a</sup> |
| pH                          | 6.30                | 6.40                | 6.20                | 6.15                |

Means with similar superscripts are not significantly different from each other ( $p > 0.05$ )

**Table 3** Sensory evaluation of date-coconut drink

| Parameters (%) / Treatments | A    | B    | C    | D    |
|-----------------------------|------|------|------|------|
| Taste                       | 5.10 | 6.12 | 6.10 | 5.19 |
| Flavour                     | 3.74 | 5.29 | 5.10 | 4.12 |
| Juiciness                   | 4.20 | 6.33 | 6.10 | 5.12 |
| Colour                      | 5.15 | 7.30 | 7.90 | 6.12 |
| Overall Acceptability       | 5.23 | 7.91 | 6.90 | 6.10 |

Means with similar superscripts are not significantly different from each other ( $p > 0.05$ )

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