

Proximate Analysis and Sensory Evaluation of Honey Produced from Date (*Phoenix Dactylifera Linnaeus*) Extrate

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Abstract

This study investigated the proximate analysis and sensory qualities of honey produced from date extract, with the aim of assessing its nutritional quality and consumer acceptability. The ingredients used was date fruits which was thoroughly washed with water, while the seed was removed, oven dried at a 650 C for 6hours and stored in the air tight polyethylene bags and then boiled, allow to cooled and sieved to collect the extract. Proximate analysis was carried out to determine the moisture, ash, crude protein, crude fat, crude fibre, and carbohydrate content of the honey sample. The results revealed that the honey produced from date extract is rich in carbohydrates (23.36-24.06%), with moderate levels of protein (1.97-2.01%) and ash (2.65-2.59%), while containing minimal fat (2.89-2.82%) and fibre (0.07-0.07%), thereby confirming its potential las an energy-dense natural sweetener. Moisture content was within acceptable limits, indicating good storage stability on this results moisture (68.45%), fat (2.82%), ash (2.59%), Crude fibre (0.07%), protein (2.01%) and carbohydrate (24.06%) and the sensory evaluation was conducted using a panel of assessors to rate attributes such as taste 8(40.0%), aroma 9(45.0%), texture 8(40.0%), appearance 8(40.0%) and overall acceptability 11(55.05). The sensory scores showed that the honey was highly rated with favourable acceptance comparable to conventional natural honey. The findings suggest that honey derived from date extract can serve as a nutritious and palatable alternative to bee honey, offering both health benefits and commercial potential for local food industries.

Keywords: Proximate, Date, Honey, Sensory, Extraction, Evaluation, Analysis

1. Introduction

Honey is a natural sweet substance widely valued for its nutritional, medicinal, and preservative properties. Traditionally derived from the nectar of flowers through the enzymatic activity of bees, honey has been produced and consumed for centuries. However, due to increasing demand, seasonal limitations, and concerns about adulteration, alternative sources of hone-like products are being explored asserted by Sidhu; (2008). One such promising alternative is honey produced from date (*phoenix dactylifera*) extract.

Dates (*phoenix dactylifera*) are rich in natural sugars (mainly glucose and fructose), minerals, vitamins, and phenolic compounds, making them an ideal candidate for producing a honey substitute (Tengberg, 2012). The extraction and processing of date fruit into a honey-like product not only adds value to this widely cultivated fruit but also provides a plant-based alternative to bee honey, suitable for vegetarians and vegans illustrated by Omolara et al., (2025). To ensure the quality, nutritional value, and consumer

acceptance of date-derived honey, proximate analysis and sensory evaluation are essential (Yasawy, 2016). Proximate analysis involves determining the basic nutritional composition of the product, including moisture, ash, protein, fat, fiber, and carbohydrate content. These parameters are critical for understanding the product's shelf life, energy value, and overall suitability for human consumption according to Rivera et al., (2012). On the other hand, sensory evaluation assesses the organoleptic qualities such as colour, aroma, taste, texture, and overall acceptability. This study focuses on evaluating the proximate composition and sensory attributes of honey produced from date extract, aiming to assess its potential as a viable and acceptable alternative to traditional bee honey.

Chemical and Nutritional Compounds of Dates:

Dates are highly nutritious fruits with a rich chemical profile that makes them an excellent source of energy and essential nutrients in-line with the study of Singh et al; (2023). Their composition varies slightly depending on the variety, ripeness, and growing conditions, but the general nutritional and chemical constituent includes:

Carbohydrates: Is the main component and dates are composed of 60-80% carbohydrates, primarily in the form of simple sugars such as glucose, fructose, and

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sucrose which varies with date variety. These sugars provide quick and efficient energy, making dates ideal for rapid energy replenishment (Alkaabi et al., 2011).

Dietary Fiber: Dates are a good source of dietary fiber (6-8%), both soluble and insoluble. Fiber supports constipation, and may help regulate blood sugar levels suggested by Tan *et al*; (2024).

Proteins and Amino Acids: Bello *et al*; (2024) suggested that protein content is relatively low (1-3%) but include essential and non-essential amino acids, such as: alanine, arginine, valine, lysine and glutamic acid.

Fats: Dates contain a very small amount of fat generally <1% and the fat is mostly unsaturated and includes oleic, linoleic, and palmitic acids (Adeyemi *et al*; 2024).

Vitamins: Dates are rich in several B-complex vitamins and small amounts of other vitamins: vitamin B₁ (thiamine), vitamin B₂ (riboflavin), vitamin B₃ (niacin), vitamin B₆ (pyridoxine), folate, vitamin A in the form of beta-carotene), vitamin K (Carr *et al*; 2025).

Minerals: Dates are excellent source of essential minerals, including potassium which helps regulate blood pressure and fluid balance, magnesium important for muscle and nerve function, calcium vital for bone health, phosphorus, iron important for red blood cell production, zinc, copper and selenium (Harrison and Oria; 2019).

Phytochemicals and Antioxidants: Dates contain polyphenols, flavonoids, tannins and carotenoids that exhibit antioxidant, anti-inflammatory, and antimicrobial properties. These compounds help protect against oxidative stress and chronic diseases (Syahrul Anis Hazwani *et al*; 2023).

Moisture: Moisture content varies depending on the date variety and storage but generally ranges between 15% and 30% in dried or semi-dried dates. The rich nutritional profile of dates including natural sugars, fibers, essential minerals, vitamins, and antioxidants makes them an ideal base for value added food products like date-based honey. Their high carbohydrate and low fat content, along with a good mineral balance, also contribute to the preservative and functional benefits of such products (Al-Dous et al., 2011).

2. Objectives of the Study

The main objective of the study was to evaluate the nutritional and sensory qualities of honey produced from date (*Phoenix dactylifera*) extract. The specific objectives of the study are to:

1. Determine the proximate composition of date-extract honey, including moisture content, ash, crude protein, crude fat, crude

fiber, and carbohydrate content, to assess its nutritional profile and storage stability.

2. Conduct sensory evaluation of the product to assess consumer acceptable qualities such as colour, aroma, taste, texture, and overall acceptability using a structured sensory panel.
3. Assess the feasibility of producing a nutritionally adequate and sensory acceptable honey alternative from date extract, contributing to food innovation and value addition.

3. Materials and Methods

Study Area: This study was carried out in Food Processing Laboratory, Home and Rural Economics of Oyo State College of Agriculture and Technology, Igboora. The area falls within South West region of Oyo State and noted for both hot and cold weathering condition.

Procedures for Data Collection: The data was collected through the use of some samples product to be produced and a well-structured questionnaire was administered to the respondents to ascertain their view about the product.

Source of Materials: 1000g of Date fruit was purchased at Towobowo Market in Igboora, Ibarapa Central Local Government area.

Sample Collection: The date fruit were thoroughly washed with water, while its seed was removed, sundried at a 65⁰ C for 6 hours before stored in the air tight polyethylene bags.

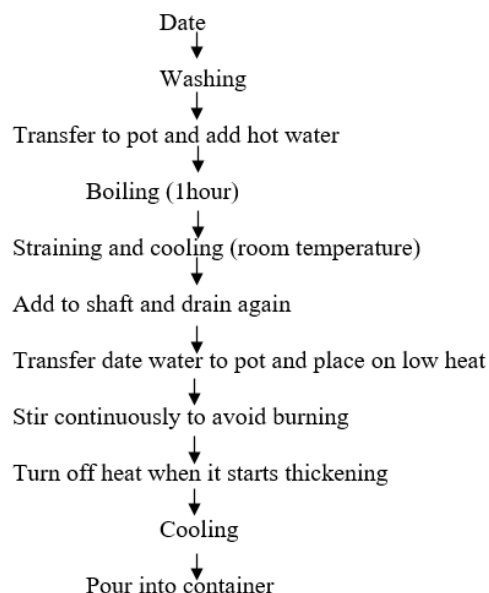


Figure 1: Flow chart for the production of Date (Source: Ogbonyomi & Azonuche; (2023))

Ingredients used in the Preparation of Date Honey:

Ingredient	Quantity
Date fruit	1000g

Methods used in the Production of Honey from Date fruit:

- i. Add dates to a large bowl and pour boiling hot water over them. Soak for at least 2 hours until softened.
- ii. Once soft, mash them well with a masher. They should be completely soft.
- iii. Strain the liquid through a nut bag or a thin muslin cloth.
- iv. Squeeze it well to extract any liquid. You may also rehydrate the pulp again and extract the juice once more.
- v. Transfer the strained liquid to a pot and bring it to a boil on a medium heat.
- vi. Keep stirring at regular intervals to prevent burning at the bottom.
- vii. Boil the mixture until it becomes thick. The right consistency is to be as thick as honey. It took 11 minutes on a medium high flame.
- viii. Cool this completely and transfer to air tight glass jar and refrigerate.

Evaluation of Sensory Qualities: Twenty (20) trained panelists was used among the academic and non-academic staff in the Department of Home and Rural Economics at Oyo State College of Agriculture and Technology, Igboora Oyo State. The parameters used to analyses are in term of appearance, aroma, taste, texture and overall acceptability using 9-point hedonic scale ranging from like extremely (9) to dislike extremely (1). Twenty (20) panelists, who are familiar with the quality attributes of date honey was selected from among staff and students of the Department of Home and Rural Economics of Oyo State College of Agriculture and Technology, Igboora.

Moisture Content Determination: As shown in Table 1 moisture content (MC) obtained in the production of honey extracted from date had the highest percentage of 69.05 to 68.45% with the study of Adegbanke et al (2025) who found that moisture content ranged from 19.34% to 61.57%. However, the highest moisture content value were determined from the production of honey extracted from date indicating that the honey production cannot take a long period of time before deterioration so the extraction of date in producing honey will only occupy a short period of time before consumption in which the higher reduction obtained in the moisture content are in agreement with the report of Laouar *et al*, (2021) that increase in temperature reduce the water content of food production.

Crude Fat Content Determination: The crude fat content obtained in the production of honey extract from date had the lowest percentage of 2.89% indicating that crude fat are present in honey production and the higher reductions obtained in the crude fat content of honey produced from date extract illustrated by Okeke et al., (2025).

Ash Content Determination: With the suggestion of

An evaluation of the ash content of the proximate analysis of honey produced from date extract revealed that ash content of the honey had 2.65 to 2.58 percent which can be seen that honey produced from date extract had low ash content and the ash content is indicative of the mineral composition in the production of honey and this suggests that honey produced from date extract had lowest ash values and likely to have lower amount of food minerals (Laouar, et al; 2021).

Crude Fibre Content Determination: Higher crude fibre content in honey production had 0.65 to 0.07 percent and the lowest crude fibre values were obtained in the honey production indicating that there is low in crude fibre content in the production of honey produced from date extract is not likely to affect the gastro-intestinal organ of consumers (Tan et al; 2024).

Crude Protein Content Determination: Bello *et al*; (2024) asserted that the protein content on the production of honey extracted from date had lowest amount of 1.97 to 2.01 percent and the lowest protein content.

Carbohydrate Content Determination: The Kim *et al*; (2022) observed that carbohydrate content of the production honey extract from date ranged from 23.36 to 24.06 percent and this is recorded high in carbohydrate content. The higher carbohydrate content observed in honey production extracted from date.

4. Discussion

Taste: The taste of honey produced from date extract was accepted with the highest score of 40.0% in like very much in parameter and 8 in score rate indicating that the taste of honey produced from date extract was liked by the trained panelists which means it was acceptable in line with the finding of Muhammed *et al.*, (2023) which based on the finding of high acceptability of date-based honey in term of taste and who also reported positive consumer responses to caramel-like sweetness of date extract honey.

Aroma: However, panelists in this study rated the aroma slightly lower compared to values reported by Abubakar *et al*; (2021), possibly due to differences in the variety of date used. As shown in Table 2, the aroma of the honey produced from extraction of date was accepted in term of aroma with 9(45.0%) indicating the highest score and percentage which means that sensory evaluation in term of aroma was liked by the panelists.

Texture: The texture of honey produced using date extraction was liked and accepted with the highest amount in frequency, parameter and score rate of 8(40.0%) which means the texture was acceptable by the consumers (Matins; *et al*; 2023).

Table 1: Proximate Composition of Honey Produced from Date Extract

Sample	M (%)	CFAT (%)	ASH (%)	CFIBRE (%)	CP (%)	CHO (%)
Honey from Date Extract	69.05-68.45	2.89-2.82	2.65-2.59	0.07-0.07	1.97-2.01	23.36-24.06

M= Moisture, CFAT= Crude Fat, Cfibre= Crude Fibre, CP= Crude Protein, CHO= Carbohydrate

Table 2: Sensory Qualities: The result obtained on the Sensory Qualities of Honey Produced from Date Extract

Parameter	Score	Taste	Aroma	Texture	Appearance	Overall acceptability
Like extremely	9	6(30.0)	3(15.0)	3(15.0)	7(35.0)	4(20.0)
Like very much	8	8(40.0)	9(45.0)	7(35.0)	8(40.0)	11(55.0)
Like Moderately	7	4(20.0)	4(20.0)	8(40.0)	3(15.0)	3(15.0)
Like Slightly	6	1(5.0)	2(10.0)	00	2(10.0)	1(5.0)
Neither Like Nor Dislike	5	00	2(10.0)	1(5.0)	00	1(5.0)
Dislike Slightly	4	1(5.0)	00	00	00	00
Dislike Moderately	3	00	00	00	00	00
Dislike Very Much	2	00	00	1(5.0)	00	00
Dislike Extremely	1	00	00	00	00	00
Total		20(100.0)	20(100.0)	20(100.0)	20(100.0)	20(100.0)

Source: Field survey, 2024.

Appearance: The appearance was accepted and this had highest percentage of 40.0% in percentage and 8.0 in frequency, 8.0 in score rates and like very much in parameter indicating that the appearance of honey produced from date extraction was acceptable and liked by the panelists with the supports of Olsen *et al*; (2023).

Overall acceptability: In term of taste, aroma, texture and appearance the overall acceptability of honey produced from date extract was obtained and this was accepted by the consumers with the highest score in percentage of 55.0, 11 in frequency, 8 in score rate and like very much in parameter indicating that honey production from date extract was accepted by the consumers and this should be used to replaced sugar or syrup in the production of fruit drinks in the food processing to add more nutritional value to drinks for easy and reliable consumption. Overall, the results of this study agree with previous findings that honey produced from date extract is rich in carbohydrates, contains moderate moisture and is sensorially acceptable (Lawless *et al*; 2014).

5. Conclusion

The findings of this study show that honey produced from date extract possesses a nutritionally valuable composition comparable to that of natural floral honey. The proximate analysis revealed that the date-based honey contains a high carbohydrate content, which contributes to its energy-yielding capacity, along with moderate levels of moisture, indicating good storage stability when properly processed. Small but nutritionally relevant quantities of protein, ash, and lipids were also present, demonstrating that the products retain essential nutrients inherent in date fruits, including trace minerals and organic compounds that support its functional quality.

6. Recommendations

It is hereby recommended in this study that the food processors should replace sugar to honey extracted from date for the production of snacks and also should be used for syrup in the production of all kinds of fruit punch and fruit drinks to maximize the degree of likeness of consumers.

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