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Formulation and analysis of spread using dates seed

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Abstract
This study aims at the formulation and analysis of a spread prepared using dates seed. The seeds were sundried to remove moisture and was ground into a powder. This was used along with dates pulp to formulate the spread. The other ingredients used were cocoa powder, powdered sugar and vanilla essence. These ingredients were added to enhance the taste and flavor of the spread. The various physio-chemical tests conducted were tests for protein, fat, moisture, ash, crude fiber and pH and the values were found to be 3.02%, 8.68%, 43.04%, 98.7%, 5.46% and 4.62 respectively. The spread was analyzed for several sensory attributes like taste, texture, color, flavor, aroma, spreadability, graininess and consistency.

Keywords: cocoa powder, powdered sugar, vanilla essence, physio-chemical tests

Introduction
Dates seed was mainly incorporated to reduce the agro-waste and they contain protein (2.3–6.4%), fat (5.0–13.2), dietary fiber (22.5–80.2%) and minerals. Cocoa powder was used for the flavor of the spread and they reduce LDL cholesterol, blood clots and high blood pressure.
Phoenix dactylifera, commonly known as date or date palm, is a flowering plant species in the palm family, *Arecaceae*, cultivated for its edible sweet fruit. Research studies have reported that dates are rich in macroelements mainly potassium, phosphorous, calcium, chlorine and magnesium and have appreciable quantities of microelements essentially iron, manganese, copper and zinc. The antioxidants in fruit possess anti-inflammatory, anti-hemorrhagic and anti-cancer properties. (Weill Cornell-2016.).
Dates seed are the by-product of date stoning, either for the production of pitted dates or for the manufacture of date paste. The date seed is a hard-coated seed, usually oblong, ventrally grooved, with a small embryo. They can also be used as a source of oil (which has antioxidant properties valuable in cosmetics), as a coffee substitute, as a raw material for activated carbon or as an adsorbent for dye-containing waters (Banat *et al*., 2003). Al- Farsi *et al*. who researched the functional properties of date seeds, their reported composition was 3.1–7.1% moisture, 2.3–6.4% protein, 5.0–13.2 fat, 0.9–1.8% ash and 22.5–80.2% dietary fiber. It is found that the total mineral content that was found in date seed was comparable with the mineral content in barley. This shows that the date seed can be as a good source of minerals, and can also be used to substitute the usage of barley in food products for the same purpose. (Abdul Rahman, R. *et al*., 2013)
Agro-waste is defined as waste which is produced from various agriculture activities. These agro-wastes include manures, bedding, plant stalks, hulls, leaves, vegetable matter and seeds. Seeds such as grape seed, pomegranate seed, and olive seed are also important in terms of functional food and dietary fiber but not covered here due to space limitation. **(**Mohammad B. Habibi Najafi, 2014). With world production of dates reaching 6.9 million tons in 2004, from this approximately 863 thousand tons of date seeds are produced. Since a large quantity of date seeds are being produced it is very important to utilize them. **(**Mohammad B. Habibi Najafi, 2014).

Materials and Methods
All the raw materials were procured from local market. The suppliers for the raw materials were chosen based on the quality and price. The following is the table which shows that quantity of the ingredients added.

Table 1: Quantity of raw materials used

S. No	Ingredients	Quantity
1	Dates	500 g
2	Sugar	200 g
3	Cocoa powder	50 g
4	Vegetable oil	10 ml
5	Vanilla essence	5 ml
6	Salt	5 g

Preparation of dates seed powder
The seeds were first stoned from the date fruit and was sun-dried for 3 days. The seeds were then ground using milling machines. The obtained powder was sieved using a sieve of mesh size 6.03mm to obtain a fine powder.

Preparation of dates seed spread
300 g of date fruit was soaked in hot water for 15 minutes until it became mushy. The soaked dates along with 200 g of date seed powder, 200 g of sugar, 50 g of cocoa powder, and 5 g of salt was blended to make a smooth paste. At the end, 5 ml

of vanilla essence was added. 40 ml of vegetable oil was added to obtain the desirable consistency.

Proximate compositional analysis

Moisture: The moisture was analyzed by the AOAC method. 5 g of the sample was weighed. The sample was kept for drying in oven at 105°C for 12 hours. The sample was allowed to cool in dryer. The final value was again measured for the total moisture content. (http://www.fao.org)

Ash: 5 g of dry sample was placed in a crucible previously calcined and brought to constant weight. This was placed in the furnace and was heated at 550°C for 12 hours. This was let to cool and then transferred to the crucible which was again weighed with the sample. (http://www.fao.org)

Protein: The protein was found by Khjeldahl method with the help of concentrated sulphuric acid, copper sulphate and potassium sulphate, which help in the conversion of nitrogen to ammonia. Once the nitrogen content has been determined it is converted to a protein content using the appropriate conversion factor (http://www.fao.org)

Fat: The fat was determined using a Soxhlet extractor using diethyl ether (boiling point, 55°C).8 to 10 g of the product was used as sample. The difference between initial and final weights was used for calculation. The experiment was conducted in duplicates. (http://www.fao.org)

Crude fiber: 3g of defatted dry sample was taken in a crucible for Fibertec hot extraction and 150 ml of 0.64 N of hot sulphuric acid was added. This was followed by 3 drops of n-octanol to prevent foaming and boiled for 10 min. then 150 ml of 0.556 N NaOH was added along with 3 droplets of n-octanol and boiled for 10 min. In both process washing with hot deionized water was applied. Solvent was evaporated and the crucibles were dried at 130°C for 2 hours and cooled in desiccator and weighed. The sample in the crucible was ashed at 550°C for 3 hours and cooled down and weighed (Heshe. *et al*. 2015).

Sensory analysis: The sensory analysis was done with 50 panelists. The panelists were selected in random to avoid selection bias. The panelists were provided with 2 samples. Sample (A) was date seed spread and sample (B) was date seed spread coated on a piece of bread. A 9-point hedonic scale was used for rating the samples on various parameters.

Results and Discussion

The physicochemical and the sensory parameters the spread was tested for have been tabulated, analyzed and discussed in detail below.

Proximate Analysis

Table 2: Proximate analysis of the dates seed spread

Tests	Values
Protein	3.02%
Fat	8.68%
Crude fiber	5.46%

However, the crude protein of seed is generally found to be higher than that present in the flesh (Ibrahim. A *et al*., 2012). The product was also found to have a very low-fat content. Various other studies showed that the content of polyphenols and the antioxidant activity were much higher, up to 10-fold, in date seeds compared to date fruits (Carine Platat *et al*., 2014)

Physical analysis

Table 3: Physical tests for the dates seed spread

Tests	Values
Moisture	43.04%

Chemical analysis

Table 4: Chemical tests for dates seed spread

Tests	Values
pH	4.62
Ash	4.935 g

Sensory Analysis

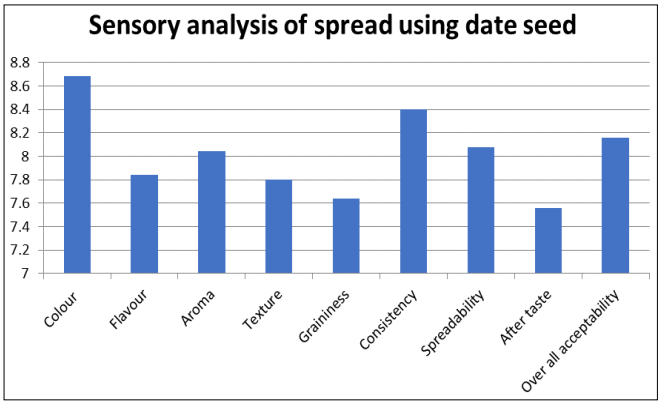

Fig 4.2: Sensory analysis of spread using date seed

The average score for the overall acceptability was found to be 8.16. The spread had a good score for the overall acceptability. The good aroma and the taste contributed to this.

Conclusion

The effect of incorporation of dates seed in a spread was studied in detail. The main aim of utilizing the nutrient rich agro waste in a food product was achieved. The most important attribute for the consideration of a product is its sensory characteristics. In terms of sensory analysis, and nutritional analysis, tests were performed and accurate values were obtained. The results of various sensory parameters greatly contributed to its overall acceptability. The spread can be packed in glass containers or polyethylene containers. Both these materials are generally preferred as it has good moisture barrier properties and also has a high melting point. They can also provide great shelf life extension and presentation appeal. From the results obtained, it can be concluded that the incorporation of dates seed can contribute to reduction of agrowaste and also the spread in which it was incorporated

showed positive effect on the sensory and physicochemical properties.

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