



**Abu Dhabi Food Control Authority**  
**Development Sector**  
**Research & Development Division**

**Technical Report** تقرير فني

<b>Title</b> العنوان	<b>Enrichment of Date Paste</b>	
<b>Project Team</b> فريق العمل	Mohamed Al-Farisi and CY. Lee	
<b>Duration</b> فترة المشروع	<b>From:</b> Jan. 2011	<b>To:</b> Dec. 2011

**Background** خلفية عن الموضوع

Dates are a popular fruit among the population of Middle Eastern countries, providing a staple food for millions of people around the world. In addition, date paste (pitted and minced dates) is becoming a popular date product in the United Arab Emirates. The paste is mainly consumed in original form, but it is also used as a major ingredient by bakery and confectionery industries for making cookies, sweet breads and candy bars. One of the main problems facing date paste is the tendency of the paste to get harder during storage. The firmness (softness) of the date paste is mainly determined by moisture content and date varieties, however, hydration by steaming or soaking date paste increase the risk of browning and fermentation (Barreveld, 1993).

Dates seeds (which constitute between 8 and 15% of date fruit weight (Al-Farisi et al, 2007)) are considered a waste product of many date processing plants. At present, seeds are used mainly for cattle, sheep and camel feeds however date seeds have certain nutritional properties which could be used to improve the human diet. Date seeds contain higher amounts of protein, fat and dietary fibre than date flesh, as reported by Besbes & Blecker (2004); Aldhaheri et al (2004); Hamada et al (2002); Sawaya et al (1984); Al-Farisi et al (2007); Al-Farisi & Lee (2008). The high content of dietary fibre in date seeds (22.5-80.2%) could have dietary implications for certain conditions, such as diabetes, hyperlipidemia, and obesity, and may have a protective effect against hypertension, coronary heart disease, high cholesterol, prostate cancers, and intestinal disorders (Tariq et al., 2000). Date seeds also contain high levels of phenolics (Al-Farisi et al., 2007). Some of these phenolic compounds (such as phenolic acids and flavonoids) have been shown to possess many beneficial effects, including antioxidant, anticarcinogenic, antimicrobial, antimutagenic, and anti-inflammatory activities, and the reduction of cardiovascular disease (Shahidi & Naczki, 2004).

As a large quantity of seeds is produced as by-product of date processing, and seeds contain a significant amount of bioactive phenolics and dietary fibre, one aim of this study was to utilize date seeds to produce enriched date paste which is high in dietary fibre and antioxidants. A further objective was to optimise the firmness of date paste.

**Problems** التحديات

The hardness of date paste resulting from storage reduces its shelf life and hydration. While the current practices of steaming or soaking of date paste increases risk of browning and fermentation.

**Objectives** الأهداف

- To utilize date seed for producing enriched date paste high in dietary fibre and antioxidants.
- To optimise the firmness of date paste.



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### طريق العمل Methods

#### 1. Dates Sample

Khalas dates (low grade) were used in this study and were procured from Al Foah Company, Al Ain, UAE. The date seeds were extracted after washing the dates. The seeds were then dried in the oven for two days. A portion of the dried seeds were then roasted in an electric oven for 60 minutes. Both dried and roasted seeds were grinded up to 0.5 mm. Date paste was prepared by chopping the date flesh to 0.5-1.0 cm. The date paste was then enriched by mixing it with three ratios of seed powders (3%, 6%, & 9%) for the dried powder (DP) and roasted powder (RP) samples.

#### 2. Proximate Analysis.

Percentages of moisture (by vacuum oven), protein content (by Kjeldahl nitrogen), and ash (by direct analysis) were determined according to the Association of Official Analytical Chemists methods (AOAC, 1995). The Bligh and Dyer method (Hanson, 1963) was used to determine the lipid content and water activity was measured by using AW SPRINT instrument.

#### 3. Dietary Fibre

Dietary fibre content was determined by Neutral Detergent Fibre method. All samples were dried in a forced-air oven (55°C for 24 h) and ground to pass through a 1-mm screen of a cutter mill before analysis.

#### 4. Total Phenolic

The total phenolic content of samples was determined according to the Folin–Ciocalteu method (Yoo, Lee, Park, Lee, & Hwang, 2004) with some modifications.

#### 5. Total antioxidant Activity

The total antioxidant activity was measured by Antioxidants Assay Kit (Sigma-Aldrich).

#### 6. Descriptive Sensory Analysis (DSA).

Descriptive Sensory Analysis (Gacula, 1997) was used to assess the sensory characteristics of enriched date paste. The following attributes/descriptors were selected for evaluation on a 5-point scale: color, firmness, sweetness, flavor and desirability. Ten male panelists, all of whom have been dealing with different aspects of dates (horticulture, protection, and processing) for at least 5 years were selected to perform the evaluation (therefore, no standard attributes were needed). The assessment was carried out under natural daylight at ambient temperature. Four date paste samples (3%, 6%, 9% and a control) were presented randomly to each panelist for evaluation. Each sample was coded with a random letter and number.

### النتائج Results

The analysis showed that dried and roasted seed powders were found to have significantly more fibre, phenolics and anti oxidants than fresh dates (Table 1).

In addition, the study showed that the 3% dried seed powder sample was found to be closer to the control date paste sample in terms of colour, desirability, flavour, sweetness and firmness compared to the 6% and 9% samples. This was also the case for the 3% roasted seed powder. When three mixture were compared to each other, the 3% dried seed powder sample was found to be closer to the control sample than the 3% roasted seed powder. The overall results found that Enriching date paste with 3% dry seed powder improved the firmness of dates paste as well as increasing the moisture by 26%, dietary fibre by 37%, antioxidants by 27% and thus its economical value (Figure 1).



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Table 1: Chemical composition of dates and seed powder.

	Moisture %	Protein %	Fat %	Ash %	Fibre %	Phenolics mg/100g	Antioxidants mM/100g
DF	13.82±0.19 <sup>a</sup>	1.56±0.19 <sup>a</sup>	0.58±0.04 <sup>a</sup>	1.85±0.11 <sup>a</sup>	5.11±0.16 <sup>a</sup>	252±2.9 <sup>a</sup>	873±52 <sup>a</sup>
DP	3.67±0.16 <sup>b</sup>	2.94±0.16 <sup>b</sup>	7.85±0.20 <sup>b</sup>	1.57±0.19 <sup>b</sup>	61.9±4.1 <sup>b</sup>	3351±51 <sup>b</sup>	1970±25 <sup>b</sup>
RP	0.60±0.01 <sup>c</sup>	3.37±0.19 <sup>c</sup>	7.95±0.28 <sup>b</sup>	1.24±0.11 <sup>c</sup>	69.7±1.7 <sup>c</sup>	3386±54 <sup>b</sup>	2035±31 <sup>b</sup>

\* DF=Dates flesh, DP=Dried seed powder, RP=Roasted seed powder.

\* Values are mean ±SD of three determinations on wet weight basis. Means ±SD followed by the same letter, within a column, are not significantly different ( $p < 0.05$ ).

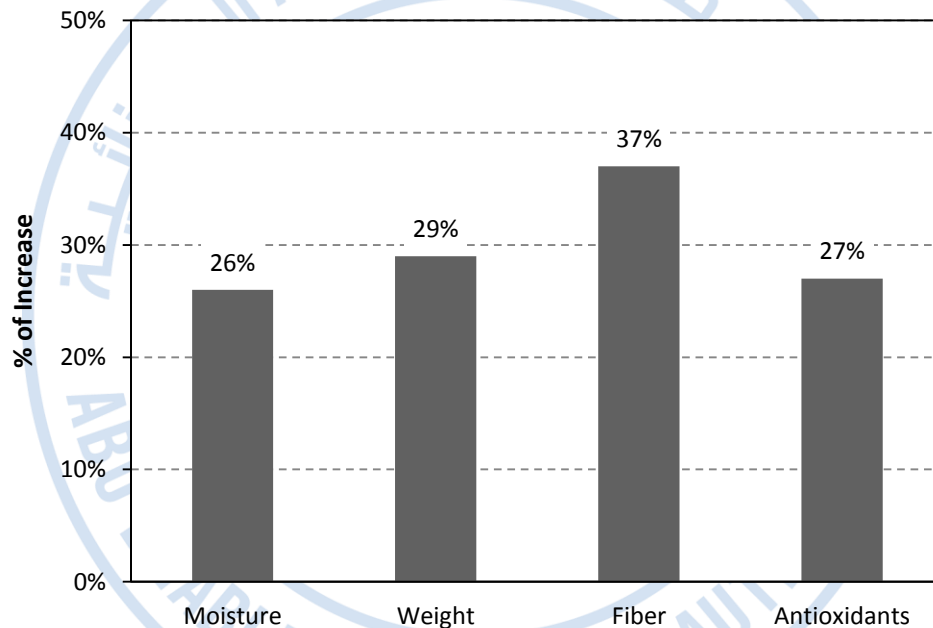


Figure 1. The percentage increase of moisture, weight, fiber, and antioxidants in enriched date paste DP3

### Recommendations التوصيات

Enriching date paste with 3% dry seed powder will improve the firmness of dates paste as well as increasing the dietary fibre, antioxidants and economical value.

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