

# Physical and chemical properties of home made Dates syrup(molasses) from middle Iraq cities

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**Abstract-** The study was conducted to evaluate physiochemical properties of dates syrup samples which selected from some middle cities of Iraq. Various physiochemical properties of dates syrup were analyzed and compared to some producing countries of date syrup (molasses).. Dates syrup quality and determination of Viscosity , Density, Specific gravity , Refraction index, Conductivity and Acidity. Statistical analysis of data revealed that there is no significant difference between results of collected samples and compared the results obtained with some producing countries which implies good quality dates syrup.

## I. INTRODUCTION

The date palm ( phoenix dactylifera L) is one of major fruits trees in Arabic world , especially in Iraq<sup>[1,2]</sup>.The world production of dates has increased during near the past years, according to FAO statistical data in 2010<sup>[3]</sup>.The date palm has played an important role in the production of date syrup (molasses) that thick liquid extracted from date palm , a solution made since ancient times and in different ways. It considered to be of economic value and food task , since it has a high concentration of sugars , mineral elements and vitamins such as vitamin A and B<sup>[4,5]</sup>. Date syrup easy to save for long periods without any additives colors or preservatives reagents<sup>[6]</sup>,it is a high energy food rich in saccharides that been used as raw material of some traditional and industrial foods<sup>[2,7,8,9]</sup>.Physiochemical analysis is important tool to monitor the quality of product, So research aimed to identify the characteristics and qualities of Iraqi molasses by collecting samples of molasses (date syrup) from the Iraqi central provinces and compared the results obtained with some producing countries of date syrup (molasses).

## II. METHODS AND MATERIALS

Dates syrup homemade type samples were selected from some Iraq cities :Najaf, Hela and Karbalaa during October 2015. 100g dates syrup sample was taken from each supplier for satisfying analysis in laboratory .

### Analytical Methods:

1. pH values measurement was made using a digital pH-meter (Hanna instrumentals)
2. Viscosity : to determine the viscosity using Ostwald viscometer .
3. Density : measurement by using Pyknometer
4. Electrical conductivity : determine by using a digital conductometer
5. Refraction Index : measurement by using Abee Refractometer .

## III. RESULT AND DISCUSSION

### 1- pH values:

In the samples of Iraq dates syrup we found that pH values between 4.5 – 5 and the maximum mean 4.751 as shown in table 1. The high level of acidity in syrups contributed to its stability against microorganisms. In a study by the Egyptian researcher<sup>[6]</sup> on date syrup (molasses) found that the values of the pH equal(4.8). In other studies for Saudis researchers<sup>[2,10]</sup> found that pH range between ( 4.55-4.91). As for one of the Iranian researchers<sup>[11]</sup> have said the pH value of date syrup of the product in Iran is ( 4.20).

And comparing the resulting values of the pH of Iraqi dates syrup are indicate that within the range of the pH values that have been analyzed in some producing countries of date syrup (molasses).

**Table 1: pH value of analytical molasses samples**

Analysis	Range		mean	Deviation SD±
	Minimum	Maximum		
pH	4.57	5.01	4.751	0.118
producing countries	4.20	4.91	4.55	0.35

**2- Viscosity :**

Viscosity designates the resistance offered by a liquid in motion or when a solid object is moved within the liquid. The unit of viscosity is the poise or the centipoises (1 poise = 100 centipoises (cp) = 1,000,000 micropoises). The poise is defined as the viscosity which requires a force of 1 dyne to bring about a relative displacement at the rate. The viscosity of individual dates syrup depends on the temperature and the water content.

From Table 2, we find that the lowest value for the for Iraqi dates syrup samples that have been studied are (14.63 cp) and the highest value is (36.98 cp), When compared with the viscosity of the syrup for some producing countries of date syrup (molasses) note that value within the range of the viscosity of the syrup to these countries<sup>[6,10,12]</sup>.

**Table 2: viscosity value of analytical molasses samples**

Analysis	Range		Mean	Deviation SD±
	Minimum	Maximum		
Viscosity (cp)	14.63	36.98	27.73	15.4
Producing countries	15.03	28.1	21.56	6.54

**3- Specific Gravity ( SG):**

Specific gravity means the ratio of the mass of a sample at (t C°) to that of an equal volume of distilled water at (t C°).

Specific gravity of date syrup<sup>[13]</sup> at 25 °C were experimentally measured a 50 ml volumetric glass pycnometer in the temperature and weight in sensitive balance , the density of samples were calculated using the following equation:

$$\rho = \rho_w \cdot ((m_s - m_v) / (m_w - m_v))$$

where  $\rho$  is date syrup density ( gm/cm<sup>3</sup>),  $\rho_w$  is water density at date syrup temperature,  $m_s$  sample mass (gm),  $m_w$  mass of water (gm),  $m_v$  pycnometer mass(gm). specific weight values of analytical date syrup samples were also be found in the table (3), and when compared with some a major date-producing countries, found it comparable values<sup>[6,11,12]</sup>.

**Table 3: SG value of analytical molasses samples**

Analysis	Range		Mean	Deviation SD±
	Minimum	Maximum		
SG (g/cm <sup>3</sup> )	1.294	1.468	1.364	0.04
Producing countries	1.112	1.368	1.240	0.128

**4- Refraction Index (n) :**

Refractive index of the date syrup were experimentally measured, Refractive index of the date syrup were higher. This is principle due to the high level of sugars and relatively low moisture content<sup>[13]</sup>.

**Table 4: Refraction Index value of analytical molasses samples**

Analysis	Range		Mean	Deviation SD±
	Minimum	Maximum		
Refractive index	25	27	26	2

**5- Electrical conductivity (EC):**

Conductivity is one of the important physical properties of the liquid food, a quality index for fluids, The electrical conductivity value refer to containing of cation and anion ion of salts and proteins.

**Table 5: EC value of analytical molasses samples**

Analysis	Range		Mean	Deviation SD±
	Minimum	Maximum		
EC (mS/ cm)	0.067	0.1169	0.102	0.02

**IV. CONCLUSIONS**

The date syrup(molasses) Iraqi industry and export it depends mainly on the unification of the Iraqi molasses specifications in terms of the physical and chemical properties and develop them in accordance with international standards, and this works to increase the production of vital product and increase the number of modern factories in this field.

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