

Survey of Iranian Date Palm Concentrate Chemical Characteristics

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Abstract: Scientific name of date palm tree is *Phoenix dactylifera* L. that it belongs to *palmaceae*. Its fruit due to having the sugars, vitamins, acids, minerals and different compounds has high nutritional value. Date concentrates are the industries that are produced in Iran recently. In this study, 14 samples of Iranian date palm concentrate from PH, Brix (ESR), acidity and sucrose were tested and analyzed by refractometry method. Data were analyzed by Sigma state 2 software and One way ANOVA. The results showed that the range and standard refractometry for pH 5.06 to 3.66 was measured and determined. The standard for ESR was determined 71.03 to 70.07 gram per Percent, the acidity from 60.98 to 50.18 gram per percent and for sucrose 0.78 to 0.41 was determined, respectively. Iranian Standards Institute has not developed standard for Iranian concentrate date palm factors. According to this subject that date palm concentrate is new products in industries, which recently have been produced in the country (Iran), so this standard can be as Iranian standard reference for date palm concentrate used in the country.

Key words: Date Palm Concentrate • pH • ESR (Brix) • Acidity • Sucrose • National Standard

INTRODUCTION

The importance of the date palm tree was appreciated by many nations over the centuries. This is due to the economical as well as the nutritional value of its fruit, hence it is one of the eldest cultivated tree crops [1]. Palm scientific name of *Phoenix dactylifera* is the first which tree has been planted by humans. Palm is a plant of the Phoenix genus and *palmaceae* or palm family. Most Phoenix species as ornamental plants grown inside or outside of the home are cared that only species in the Phoenix genus that its fruit has edible consumption [2].

Palm is a plant that grows in many parts of the world especially in the desert areas of the Middle East and has an effective role on survival of the most ancient civilizations in these areas.

Dating the use of palm products as nutrients returns to six thousand years before of Christ. While this plant growth dating back to the ancient times and the main areas of growth than was in the region of 29 to 39 degrees north latitude. According to Dawson thesis, the original

birthplace of palm trees is southwestern region of Iraq and West south and West of Iran so now half of the world production of dates is in Iraq and at Khuzestan plain Iran [3-5].

In Iran there are more than 400 varieties of dates, which it is the richest germplasm in the world. About 50 varieties of them, has a nutritional value that can be exported [6-7].

From the Iranian production of palm, 30 percent of it is converted into the waste that can be converted into palm waste processing industry used modern equipments to produce high value-added products from the sweet gold. Most of the compound in palm fruit is sugar which is about 60 to 70 percent of dry matter of the fruit [8-9].

Due to high levels of sugar in the palm, it is one of the main products of the conversion date liquid sugar or honey dates and dates concentrate that is used in many industries including manufacturing, construction industries, cakes and pastries, ice cream, candy and soda [10].

In this study, we evaluated the pH, acidity, Brix and sucrose palm concentrations referred to the Reference Laboratory of Food and Drug Administration of Urmia University of Medical Sciences.

MATERIALS AND METHODS

14 date palm concentrate samples produced in West Azerbaijan province of Iran during year 2010 were collected randomly by inspectors of Food Control Laboratories of Urmia University of Medical Sciences from different factories. All samples were stored below 4°C before analysis. Measurement of dissolved solids (Brix at 20 °C): For measurement of samples dissolved solids in water, National Standard Method no. 2685 was used [10].

Measurement of Reducing Sugar: Measurement of reducing sugar present in the samples was carried out according to the Lane-Eynon method in the Iranian National Standard No. 2685 [10].

Measuring of Acidity: For measuring samples acidity, titration method in the Iranian National Standard No. 2685 [10] was used.

Measurement of pH: In this study, for measurement of samples pH, the National Standard method No. 2685 was applied [10].

RESULTS

The results showed that the minimum and maximum values of pH of palm concentrates are 3.66 and 5.06, respectively. Minimum and maximum values of Brix were 70.07 and 71.03 gr/100 ml, respectively. The minimum and maximum standard values for sugar and acidity of Iranian palm concentrates were 50.18 and 60.98 and 0.78 and 0.41 grams percent, respectively (Table 1).

DISCUSSION

The pH, acidity, reducing sugar and dissolved solids of date concentrate were determined to be 3.5 to 4.3, 0.5 -1.3, 58 and 4 % [11]. Date palm liquid sugar since extracted from palm sap also purification and remove the pectin compounds, proteins, fiber and color is produced.

Sugar of liquid of palm dates eligibility with a 68-74 brix has 73% sugary substance [12] and its constituent sugars are glucose and fructose which is almost equal to the stands of sugar like to honey hive and fructose corn syrup.

Sugar of palm comparing to sucrose has benefits including low tendency to crystallization, low capacity of having water and be property of absorption moisture and also most power to adds sweet [13].

Results of the study done by Ramadan (2010) in Egypt showed that the moisture, total sugars, crude protein, ash and total soluble solids content of date syrup ranged as: 25.14-29.36%, 71.20-91.09%, 2.28-3.86%, 1.75-2.28% and 69.04-75.00%, respectively.

The study carried out in Oklahoma of USA by Gaily and others about effects of activation time on the production of fructose and bioethanol from date extract showed that, profiles of sugar consumption and bioethanol production using STAR were found to be almost having the same pattern for all activation periods, while fructose was consumed as well as glucose. Enhancement of fructose in sugar can only be obtained at the expense of ethanol [14].

In Hagh Nazari (2011) studies in Iran, various solidified date syrups were produced as culture media and the effect of date constituents with/without ultrasound waves irradiation were investigated using selected natural micro flora of date by agar dilution method and the results were compared with classical culture media containing PDA for fungi and PCA for bacterial cultures. The results of her investigations showed that, extracted date syrup by ultrasound waves is an ideal media for enriching *Aspergillus spp.* and used as a selective media due to its inhibition to certain bacteria and fungi [15].

The results of a study showed that mazafati palm, depending of the time of planting and harvesting is content moisture between 15 to 35 percent [16]. Depending on what stage of the cultivation of palm concentrate is removed, it will be different Brix. Results of a survey show that there are about fifteen types of micronutrients in fruits and palm dates. Elements such as Br, Ca, Co, Cu, F, Fe, Mg, Mn, K, P, Na, Zn and selenium has been identified in it [17]. Soil, harvest, agricultural nutrients and soil reinforcement such as dates many of the ingredients are fruit, dates and subsequently it's Brix. Results of study by Jamshidi et al., showed that the palm syrup per 100 grams containing of 5 grams sucrose and 74 percent is its Brix [18].

Table 1: Factor of samples, the mean and standard deviation, minimum and maximum standard for Iranian Palm Concentrate

Factor	Samples	Mean \pm standard deviation	Minimum	Maximum
PH	14	0.37 \pm 4.06	3.66	5.06
Brix	14	0.32 \pm 70.55	70.07 gr/100 ml	71.03 gr/100 ml
Acidity	14	0.92 \pm 56.69	50.18 gr/100 ml	60.98 gr/100 ml
Sucrose	14	0.07 \pm 0.59	0.41 gr/100 ml	0.78 gr/100 ml

Since any study has not been done for the chemical properties of palm date concentrate, therefore standards codification in the study is introduced for the first time in Iran the standards developed in this study for the first time in Iran is introduced. So this standard can as Iranian standard reference for date palm concentrate used in the country.

ACKNOWLEDGMENT

This study was conducted at collaboration with the Deputy for Food and Drug, Urmia University of Medical Sciences, Urmia, Iran.

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