Full Length Research Paper

Production and evaluation of organoleptic characteristics of fruit juice and low-sugar pulp of Behbahan variety dates of Kasi and Kabkab

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The purpose of this study was the production of high-value date syrup and low sugar powdered pulp and evaluation of its organoleptic characteristics. In this study, first, 100 g date were weighted and after disinfection, cleaning and removing of wastes and crushing, were mixed in 300 mL of boiling water for 20 min and then dates syrup were obtained by filter. The low sugar pulps were weighted. Next, the organoleptic characteristics of date fruit juices such as taste, color and aroma by panelists were evaluated by 5 people. The samples were analyzed by Hedonic preference test. The results showed there is no significant difference between the scores of the color or but there is a significant difference for aroma (p <0.05). Average values of pulp obtained were equal to 50 g and there is no significant difference between the results of ten samples. Pulp material obtained after drying was converted to powder.

Key words: Kabkab and Kasi dates varieties, organoleptic properties, panelists, date syrup, low sugar pulp.

INTRODUCTION

Dates fruits of Kabkab and Kasi, are widely cultivated in semi-humid areas of Behbahan, in southern Iran. Because each year significant amounts from produced dates, is wasted and disposed, so it is better for them to be processed. Date fruits are well known as a staple nutritious food and source of wealth for many years (Vayalil, 2002). Due to its high nutritional value, great yields and its long life, the date palm has been mentioned as the “tree of life” (Khan, et al. 2008). The fruits of the date palms are consumed throughout the world. Dates are being consumed in modern cultures for their pleasant flavor, odor and their biting texture in addition to their use for flavoring foods, beverages and medication (Augstburger et al., 2002). Date fruits are considered as major source of carbohydrate which include simple sugars like glucose and fructose (Myhera et al., 1999) and sucrose. They are good sources of dietary fibre and some important minerals which include iron, potassium, selenium, calcium and vitamins and it also contains vitamin C, B1, B2, A, riboflavin and niacin but it is low in fat and protein contents (Guizani et al., 2010).

In addition to their significance as an ideal high-energy food, in the folklore, the dates are believed to have many medicinal properties such as to provide strength, fitness,
and relief against a number of ailments and pains including fever, stomach disorders, memory disturbances, nervous disorders, as well as aphrodisiac and to boost the immunity. They are also considered to protect against many chronic diseases including cancer and heart diseases (Vyawahare et al., 2009) as they have been shown to contain antioxidant and antimutagenic properties (Al-Farsi et al., 2005; Vayail, 2002; Aliaith, 2008). Aqueous extracts of dates have also been shown to inhibit the lipid peroxidation and protein oxidation as well as exhibit a potent superoxide and hydroxyl radical scavenging activity (Aliaith, 2005). Panahi and Asadi (2009) reported that extract of date fruit were useful in controlling the blood cholesterol levels and also protected the CA1 neurons against oxidative injury. Methanolic and aqueous extracts of date flesh and seeds have also been shown to exhibit anti-inflammatory properties and suppressed the swelling in the foot and adjuvant arthritis (Mohammed and Al-Olki, 2004).

Date fruit is known as a source of food rich in carbohydrates and calories. Dates and its products are used in the food and pharmaceutical industries, such as ethanol, citric acid, yeast bread and high fructose date syrup (HFDS) (Botes and Zaid, 2002). World production of dates in 2002 was 4.5 million tons, and increased. 65 percentage of world production is produced in the Persian Gulf. Iran produces 18 percentage of the world's date and is one of the main producing countries (Al-Bazzaz, 2004; Iranian Date and its Market in the World, 2001; Iran Nap Co., 2001). Sucrose is the main sweetener in the world, but after 1967, other sweeteners such as high fructose syrup, with sucrose has been replaced.

Today, syrup contains high fructose concentration are produced and used as a sweetener in many countries such as the United States of America, Canada, Europe Union, Japan, South Korea and Argentina (Forristal, 2001; U.S. Department of Agriculture and Economic, 1991). Dates constitute the main part of the diet and an important source of income for the majority of the population in rural areas. They are also important for the environment, so that this product is compatible to environmental stresses such as temperature, salinity and drought (Benyamin, 1993). Low quality date is cultivated in about 60 percent of the total. This date with low size and taste, is suitable for consumption, which usually is sold as animal feed.

Despite the high sugar content of such low quality date, making them suitable for industrial use, and thus the range of by-products can be produced from these dates. Dates syrup that is probably the most common product is produced in especial way, including the extraction and boiling the syrup, in industry half or full-scale, which include the extraction process, refining and then the dates syrup is concentrated (Barreveld, 1993; Dowson, 1994; Al-Rawi et al., 1997). Aim of this study was preparation and organoleptic evaluation of syrup of two varieties date and low-sugar pulp from Behbahan, Khuzestan, Iran.

MATERIALS AND METHODS

Plant material

Two date palm cultivars grown in Behbahan, Iran were used for this study. The dates in “Tamr” stage (maturity stage) are obtained from the farmers. The samples were collected during 2014 season. 4 kg of each variety were used for experimentation. Each sample was cleaned and placed in polyethylene bags with labels, and stored in refrigerator until analysis.

Extraction of palm syrup

Certain varieties of dates (Kasi and Kabkab) from the local market in Behbahan, Khuzestan, Iran were purchased. Grinding system (EMS, MTK20, Saarbrucken, Germany) used to fine the date to thickness 0.5-1 cm was used, and after the dates with an equal amount of water were mixed in a container vapor (Model 241, Benham, London, UK), then were stirred for 20 min at 60 °C. The produced liquid was passed through the fabric, and the remain pulp was mixed with water and was extracted again.

Refining method of date syrup

In order to improve the quality of the extracted syrup, filtration treatment was used. Filtration using a filter press (Model 13039; William Boulton, Burslem, UK) was performed in two stages, large (50-mesh filter paper) and small (3 mesh filter paper).

Evaporation

Refined syrup under the same conditions using the evaporator BCH (30-L, Rochdale, UK) was evaporated (70 C ° under a vacuum of 500-600 mm Hg) to 70 ° Brix syrup was produced. Then, 5 person panelists, organoleptic characteristics of date fruit juice such as flavor, color and aroma were evaluated. The samples were analyzed by Hedonic preference test. The samples with the evaluation forms to evaluate the sensory characteristics were presented to panelists. Panelists were provided the points on each of the sensory characteristics based on scoring on any of the sensory properties. Here, assessment was carried out as a seven-point test (+3 to -3) that was very good to very bad. After scoring on the acceptability of each product quality properties in accordance with the scoring form, the results were evaluated and analyzed. The results of the samples were evaluated through a randomized complete block design. 100 g of dates from the two varieties with 300 mL of water carefully was mixed by mixer and was heated to boil. Each of the samples for 10 minutes after boiling, were heated. We control the mixture boiling time by chronometer. The most nutrients of date by the heat were extracted into the water. The obtained mixture was filtered separately to the date syrup and pulp. The obtained pulp, carefully was weighed.

Statistical analysis

The results obtained from the analyses of the samples were
There were no significant differences between the scores of the color and taste of the product but there was significant differences in smell (P <0.05). Thus it can be inferred that the panelists evaluated, date syrup taste and color with good score but smell with little good score degree (Table 1). It is observed that the date juice acceptability by consumers were at desirable and good level. Because the nutritional value of dates that are rich in minerals and vitamins and sugar, it can be as one kind of good juice is proposed for people consumption. The 5 ppanelists, from a maximum of 40 scores date syrup taste, presented 35 scores. All panelists were provided maximum scores to color characteristic and one person panelist was provided from maximum of 30 scores, 27 scores to smell characteristic. Overall 3 panelists were provided from total of 100 scores, 97, 91 and 89 scores, which is acceptable for product acceptance by consumers (Table 2). There were no significant differences between the scores given by panelists for the taste and color, and there was significant difference for smell characteristic. The obtained results from second stage can be concluded that the wet pulp and the dried powder contents obtained from certain variety of Kabkab date was more than Kasi variety (Table 3). Although, since the amount of sugar and sweetness percentage of certain variety of date Kasi was more than variety of Kabkab date, and Kabkab date usually fresh is consuming and usually this kind of date not have any in grades 2 and 3, but Kasi date variety have necessary conditions for extraction of syrup and dried powder. So it seems that it is appropriate for preparation of the pulp from grades 2 and 3. This results are in agreement with Acourene et al. (2001) and Al-Abdoulhadi et al. 2011.

### Sensory evaluation

To the consumer, the most important attributes of a food are its sensory characteristics such as flavor, aroma,
color, texture and overall acceptability. Thus, sensory evaluation was performed for this product in order to determine the most acceptable sample by the panelists. The panelists prepared were palatability tested in terms of taste, after-taste, color, aroma and overall acceptability by panelists. With regard to the same data, there were no significant differences among all the studied products in their aroma, taste and color.

Conflict of interests

The authors did not declare any conflict of interest.

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REFERENCES


