Production and Quality Evaluation of Paste Made from Two *Jawa* Date Cultivars

Eshrag S. Bushra[1], Abdel Moneim E. Sulieman[2] Amna A. A.Aburigal [1] and Hassan A. Modawi[3]

[1] Department of Food Science and Technology, Faculty of Engineering and Technology, University of Gezira, Wad-Medani, Sudan.

[2] Department of Biology, Faculty of Science, University of Hail, Hail, Kingdom of Saudi Arabia.

Department of Food Science and Technology, Faculty of Agriculture, Khartoum University, Shambat, Sudan.

ABSTRACT

The objective of the present work was to study the production of paste from the local Sudanese date cultivars namely; red *Jawa* and black *Jawa*. The date fruit samples were subjected to physical and chemical analysis before production of the paste. The chemical, microbiological and sensory characteristics of date paste were evaluated after processing. The results indicated relative increasing of moisture content in the red *Jawa* paste (RJP) 23.34% as compared with black *Jawa* paste (BJP) 20.35%, the ash content in the (RJP) and (BJP) were 1.15% and 1.09%, respectively. Protein content in the (RJP) and (BJP) were 1.75% and 2.04%, respectively. The total soluble solid in (RJP) and (BJP) were found to be 71.5% and 73.9, respectively. The titrable acidity in (RJP) and (BJP) were found to be 0.31% and 0.41% respectively. The pH values were found to be 5.13 and 5.35 in (RJP) and (BJP), respectively. The microbial analysis of date paste showed low levels of total microbial load. The sensory evaluation indicated that all the paste samples were highly accepted by panelists. The study recommended utilization of low quality date fruits like *Jawa* in production of various products to increase its economic value.

Key words: Paste, date fruits, physical characteristics, sensory evaluation.

INTRODUCTION

Date palm (*Phoenix dactylifera*) has been an important crop in Sudan and the Arabian Gulf countries. The Sudan has a wide range of date palm cultivars. Any small farming household tends to grow a variety of dates in order to be less vulnerable both to annually changing market prices and disease affecting only specific types. The people are very proud of the taste, sweetness, and nourishing merits of their dates and believe that these originate from their rocky land containing special minerals.

Date palm has always played an important part in the economic and social lives of the people of these regions (Besbes *et al*., 2004; Al-Farsi *et al*., 2007 and Al-Jasser, 2010). Date fruit is a highly nutritious food. It is a rich source in carbohydrates (70–80%) comprising mainly of sugars and dietary fibers, making it one of the most nourishing natural foods available to the man. Dates

are also a good source of some vitamins (A, B_1, B_3, C) and macro-elements like phosphorus, iron, potassium and calcium (Ahmed and Ramaswamy,2006).They are also being exceptionally rich in potassium and extremely low in sodium; is a desirable food for hypertensive persons who are advised to consume low sodium diets.

The increase in dates' production will, therefore, play an extremely significant role in worldwide improvement of the nutritional status of people, with special reference to calories and important minerals (Al-Hooti *et al*., 2002).

Jawa dates can originate from self-sown trees or date varieties that have reverted to kind either through uncongenial surroundings, improper cultures, insufficient water or other reasons. *Jawa* dates are fed to the livestock and sold on the market for a low price. The sample fruits are small and their colour varies from light yellow to yellowish red. *Jawa* trees often consist of a clump of shoots from the same root which is called *Bu'rah* or *Hufra* .

Date processing industries manufacture a variety of date products such as date-paste, date-syrup, date dip, date-honey, date-jam and date-vinegar. Date pectin, dietary fiber and syrup are some of the date substances which find a plethora of applications as a thickener or gelling agent in processed foods, i.e. confectionery products, jams, table jellies, soft cheeses, yoghurts, etc (Al-Hooti *et al.*, 2002).

Date paste has been utilized as filler and also to substitute for sugar in many food formulations (Ahmed and Ramaswamy,2006). The confectionary industry has utilized date paste as one of its major ingredients.

The Sudanese kitchen uses dates for the following dishes such as *Madidah Balah* (a date pudding), *Kurasah al-Balah* (traditional fresh date bread, *Sharbut* (a common date wine) and *Baqaniah* (a date beer) (Takrouni, 2005).

The essential ingredient of date paste is just date fruit. Date paste has been used as filler and as a sugar substitute in many food formulations and confectioneries have been utilizing date paste as one of their major ingredients (Alhamdan and Hassan, 1999). The date paste is rich in sugar, dietary fiber minerals and trace element. The objective of this study was to process paste from two date cultivars red *Jawa* and black *Jawa* and evaluation of its quality characteristics.

MATERIALS AND METHODS

Materials

Date fruits of *Jawa* (red *Jaw* and black *Jawa*) were purchased from Wad Medani and Khartoum local markets in February, 2014. The experimental work was carried out at the Department of Food Science and Technology laboratory, Faculty of Engineering and Technology, University of Gezira Wad Medani, Sudan.

Physical characteristics of fruit

Fruit length (cm) and fruit width (cm) were measured using a Vernier caliper. Date fruit weight and pulp weight were determined using a sensitive balance.

Chemical analysis of date fruit

Proximate analysis

Samples of date fruits were cleaned by moist cloth, pitted, chopped, ground and stored in a cool dry place in glass jars for further analysis. Then the samples were subjected to analysis of

fat, crude fiber and ash content according to AOSC (1985) methods. The protein and moisture contents were analyzed according to AOAC (2000). The total carbohydrate content was determined by subtracting the sum of moisture, protein, fat, crude fiber and ash contents from 100.

Determination of minerals

Determination of potassium (K^+), sodium (Na^+) and calcium (Ca^{2+}) concentrations were accomplished by means of a flame photometer according to AOAC (1970). Iron was determined by colorimeter at wave length 560nm according to AOAC (1970).

Processing of date paste

The date paste was prepared by soaking of 1000g of each clean date samples for 5 minutes in tap water (1.5liter) and draining for 10 minutes. Then the samples were destined, macerated, and converted to a semi-solid form with approximately 20-23% moisture content. The date paste was packed in sterilized glass bottles until analyzed.

Product quality evaluation

After processing, the quality of date paste samples were evaluated using chemical and microbiological methods as well as sensory evaluation.

The chemical methods included determination of the contents of ash, and moisture content using AOAC (2000) methods. The pH value and the Total Soluble Solids (TSS) were determined using a digital pH-meter and a hand refractometer, respectively. The percentage of titrable acidity and ascorbic acid (vitamin C) content were determined according to AOAC (1990).

For the microbial analysis, One gram of each date paste sample was homogenized individually with 90 ml of distilled water. From this suspension, serial dilutions were prepared. The yeast and mould count was enumerated by culturing in potato Dextrose Agar (PDA) media and incubation was accomplished at $25C^0$ for 72 hours while total count was enumerated by culturing in plate Count Agar (PCA) media and incubation was accomplished at $30C^0$ for 48 hours. All colonies appearing on the respective selective agar media were counted, and expressed as colony forming units per milliliter (c.f.u. /ml) per ml of the sample (Harrign and McCance, 1976).

The sensory evaluation was carried out using fifteen judges who were asked to express their preferences of two coded pastes for appearance, texture, colour, flavor and overall acceptability. The results obtained by the panelists were converted to scores ranging from like extremely (9) to dislike extremely (1) (Larmond, 1982). Then the collected data were subjected to analysis of variance by using Statistical Package for the Social Sciences (SPSS) program.

RESULTS AND DISCUSSION

Fruit physical characteristics

Physical characteristics of date fruit from the Sudanese cultivars of Red *Jawa* (RJD) and Black *Jawa* (BJD)are presented in Table (1).The fruit length (cm) of RJD and BJD cultivars were 4.815 and 4.562 cm; respectively. These characteristics were slightly lower than those reported by Nour and Ahmed (1981) which were 6.3 for *Jawa* verity. The fruit width of RJD and BJD were 2.255

and 2.084cm, respectively. Both *Jawa* date cultivar was close to the value reported by Ali (1985) which was 2.17 cm.

The fruit weight of red and black *Jawa* dates was 9.989 and 9.857g, respectively. All these values were higher than that reported by Nour and Ahmed (1981) which was 6.3g. However, Sulieman *et. al.* (2012) indicated that Black *Jawa* showed the maximum fruit weight (12.78 g) which was significantly higher than that of all other date cultivars, while Red *Jawa* had the least fruit weight (6.57 g) significantly lower than that of the other cultivars. On the other hand, the weight of the two date fruits cultivars was in close agreement to that reported by Abdullah and Salah (1999) for three date palm cultivars grown in Libya which ranged 8.69 g.

The pulp weight of RJD and BJD were 8.684 and 8.576g, respectively. In addition the seed weight of RJD and BJD were 1.306 and 1.281g, respectively. The seed weight values were comparable to those reported by Sulieman *et.al.* (2012) for five date fruits cultivars which ranged between 1.1g and 1.4 g. However, most of the physical characteristics were comparable with those determined by Ali (1985). However, other studies also proved significant differences of the fruit characters in the study of cultivars (Nour *et. al*., 1986; Selim *el. al*., 1970; Ismail *et. al*., 1986).

Table (1). Date fruit physical characteristics*

Parameter	RJD	BJD
Fruit length (cm)	4.815 ± 0.076	4.562 ± 0.148
Fruit width (cm)	2.255 ± 0.0523	2.084 ± 0.079
Fruit weight (g)	9.989 ± 0.0606	9.857 ± 0.597
Pulp weight (g)	8.683 ± 0.580	8.576 ± 0.576
Seed weight (g)	1.306 ± 0.056	1.281 ± 0.038

*Average of 100 fruits

RJD = Red *Jawa* date; BJD = Black *Jawa* date.

Chemical composition of date's fruit

The chemical composition of date fruit varies according to ripening stage, cultivar, growing environment, postharvest conditions, etc. The nutritional and medicinal values of date fruit are related to its chemical composition (Tang *et. al.*, 2013). The purpose of analyzing the chemical composition was to study the effect of date composition on the quality of date paste produced from those date cultivars.The chemical composition of the two cultivars (Table 1), Red *Jawa* date (RJD) and Black *Jawa* date (BJD) are comparable in all parameters. The moisture content of RDJ and BDJ

were 4.467% and 5.083%, respectively. These values were lower than that reported by Khattab *et al*. (1982) and El-Sohaimy and Hafez (2010) who determined a range of 13-16.9% and a value of 13.8%, respectively. This difference could be due to the storage conditions, environmental conditions, as it is known that Sudan has a hot climate. The ash values were 2.119 and 2.331% for RDJ and BDJ, respectively. These values were slightly higher than that reported by Ali (1985) which was 1.33% and 0.81%. (The variation may be attributed to the difference in environmental factors). Protein content in the two date cultivars were 2.188% and 2.625 % for RDJ and BDJ, respectively. These values were slightly higher than that reported by Ali (1985) which was (1.25% and 0.29%).The fat content of Red and Black *Jawa* dates cultivars were 0.232 and 0.349%, respectively. These values of fat were in close agreement to that reported by Sulieman., *et al*., (2007) and Sulieman *et. al.* (2012) which ranged between 0.39-0.47% and 0.32-033%, respectively. It has been known that fats are mainly concentrated in the skin and have a more physiological importance in protecting the fruit than contributing to the nutritional value of the date flesh (Barreveld, 1993). The low level of the

fat content in date fruit means very low level of fatty acids and cholesterol, and this fact indicates that consumption of date fruit is safe for people suffering from heart and blood diseases.

The crude fiber content of RDJ and BDJ dates cultivars were 0.568% and 0.469%, respectively. These values were lower than those reported by Suleiman, *et al*.,(2007) and Al-Farisi and Lee (2014) which ranged between 1.5 -2.0% and 5.11-4.8%, respectively. The carbohydrates content of RDJ and BDJ cultivars were 90.426% and 89.143%, respectively. The carbohydrate value of Black *Jawa* cultivar was within the range (84.2-89.28%) reported by Suleiman., *et al*.,(2007). The values of potassium contents of the red and black *Jawa* date pulp were 128.88 and 132.9 mg/100g, respectively.

Table (2): Chemical composition of date pulp

Parameter	RJD	BJD
Moisture (%)	4.467 ± 0.077	5.083 ± 0.291
Ash (%)	2.119 ± 0.438	2.331 ± 0.179
Protein (%)	2.188 ± 0.253	2.625 ± 0.669
Fat (%)	0.232 ± 0.005	0.349 ± 0.027
Crude fiber (%)	0.568 ± 0.015	0.469 ± 0.036
Carbohydrates (%)	90.426 ± 0.586	89.143 ± 1.032
Calcium (mg / 100 g)	34.8 ± 2.379	40.66±0.503
Sodium (mg / 100 g)	2.188 ± 0.253	2.626±0.669
Potassium (mg / 100 g)	128.88 ± 0.394	132.9 ± .064
Iron (mg / 100 g)	0.57 ± 0.014	0.58 ± 0.051

RJD = Red *Jawa* date; BJD = Black *Jawa* date.

The highest value of calcium was found to be 40.66 mg/100g in BJD as compared with those of RJD dates 34.81 mg/100g. The values of sodium in Red and Black *Jawa* dates were 2.188 and 2.63, respectively. The contents of iron in the RDJ and BDJ dates were 0.57 and 0.58, respectively. All these values were within the range that reported by Al-showiman (1998) which ranged between (0.1-916 mg/100g). These findings agreed with many of previous literatures which revealed that

the date palm fruit contains a suitable concentration of calcium, potassium, phosphorus and selenium which are very important for human body and metabolic operations in the

human cells. Generally, the chemical composition of date fruits revealed that the date palm fruits contain the most essential nutritional matters which are necessary to human activities and saving their life.

Chemical composition of date paste

The chemical composition of the different date paste samples is shown in Table (3). The moisture content (%) of the Red *Jawa* date paste (RJDP) and Black *Jawa* date paste (BJDP) were 23.339% and 20.353% respectively, however, these values were higher than those reported by Ahmed *et al*. (2005) and Al-Farisi and Lee (2014) who reported a value of 12.5% and 13.82%, respectively. The higher content of moisture in date paste will help maintaining soft firm paste for longer time during storage.

The protein content (%) in RJDP and BJDP were 1.745% and 2.041%, respectively. The protein content was in close agreement to that determined by Al-Farisi and Lee (2014) who found a value of 1.27% in date paste. The ash content (%) in RJDP and BJDP were 1.151% and 1.089% respectively. These values were relatively less than that reported by Al-Farisi and Lee (2014) who found a value of 1.83% in date paste.

The Total Soluble Solids (TSS) in RJDP and BJDP were 71.463 %and 73.947%, respectively. These values of date paste were lower when compared with those reported by Yousif *et al*., (1990) and Ahmed *et al*., (2005) who gave a value of 78.2% and a range of 75.3-76.1%, respectively. The titrable acidity of the RJDP and BJDP were 0.302 and 0.404%, respectively. The pH value of RJDP and BJDP were 5.13 and 5.354, respectively. These values were in close agreement to that reported by Yousif *et al*. (1990) which was 5.69, however, Mrabet *et al.* (2008) found that the pH of the organic paste was 4.4 while that of the conventional paste was 5.3.

Table (3): Chemical composition of date paste

Parameter	RJDP	BJDP
Moisture (%)	23.339 ± 0.501	20.353 ± 0.521
Ash (%)	1.151 ± 0.105	1.089 ± 0.0352
Protein (%)	1.745 ± 0.435	2.041 ± 0.146
Total Soluble Solids (TSS)%	71.463 ± 0.499	73.947 ± 0.281
Titrable acidity (%)	0.302 ± 0.002	0.404 ± 0.003
pH	5.13 ± 0.042	5.354 ± 0.136

RJDP = Red *Jawa* date paste; BJP = Black *Jawa* date paste.

Microbial analysis of the date paste

The microbial analysis of paste Red *Jawa* paste (RJP) and Black *Jawa* paste (BJP) is shown in Table (4). The analysis revealed presence of ($4x10^4$) and ($3x10^4$) c.f.u/g of total viable counts in (RJP) and (BJP), respectively. This result is in close agreement to that obtained by Ibnoof (2007)

who reported ($3x10^4$) c.f.u/g for both tamarind (*Tamaridus indica*) pectin jam and commercial pectin jam.

Table (4) also shows absence of yeast and molds in all tested paste samples. Yeast and moulds are fungi which are responsible of the food spoilage and may produce mycotoxin (Buchanan and Doyle, 1997).

Therefore, these pastes are acceptable for consumption since the moulds and yeasts standards are lower than 5×10^2 CFU/mL (NF ISO 7954/1988: Classification Index: V 08-022).

Table (4). Microbial load (c.f.u/g) of date paste**.**

Parameter	Total viable count	Mould and yeast
RJP	$4 X 10^4$	Nil
BJP	$3 X 10^4$	Nil

Average of three readings.
RJP = Red *Jawa* paste.
BJP = Black *Jawa* paste.

Microbiological properties are an essential analytical measure, providing fundamental insight on the conservation of food. Limited information on date paste and its microbiological properties are available in the literature. The yeasts, moulds, coliforms, salmonella are the most important factors determining the overall quality and consumer acceptability of fresh fruits and vegetables (Mrabet *et. al.* (2008).

Sensory evaluation of date paste

The sensory evaluation of two date paste samples was shown in Table (5) and plate (1). The sensory analysis indicated that all paste samples were highly accepted by panelists who generally preferred paste made from red *Jawa* dates more than thate made from black *Jawa* dates due to its appealing colour and flavor.

A B

Plate (1). A: Red *Jawa* date paste; B: Black *Jawa* paste

Table (5). Mean sensory scores of *Jawa* date paste

Samples	Appearance	Texture	Colour	Flavor	Overall acceptability
RJP	6.87±0.33[a]	7.27±0.24[a]	7.27±0.26[a]	7.20±0.29[a]	7.20±0.32[a]
BJP	6.60±0.21[a]	7.13±0.30[a]	6.67±0.31[b]	7.13±0.37[a]	6.60±0.33[b]

RJP = red *Jawa* paste ;BJP = black *Jawa* paste.

CONCLUSION

The present study confirmed the possibility of production of paste product from the local Sudanese date cultivars namely; Red *Jawa* and Black *Jawa* which are known of their inferior quality and not eaten raw like other date cultivars. The low moisture and the high acidity of organic date paste were two important positive attributes for its storage and potential manufacturing uses. These date cultivars have low cost and sometimes were used for feeding animals. The equipment necessary to produce such products were easily obtainable, relatively inexpensive, and can be used for the small-scale industry (e.g household).

Date paste is potentially a good food-manufacturing ingredient, attention should be paid since consumers are not tolerant to any form of contamination that may occur during the handling and manufacturing process. Hygienic conditions must be available while making date paste at home

REFERENCES

Abdullah M. E. and. Salah, S. E. (1999). Tree Fruit Characteristics of Date Palm Cultivars Grown in Three Libyan Oa-ses," University of Garyounis, Benghazi, 1999.

Ahmed, J., Ramaswamy, H.S., and Khan, A.R. (2005). Effect of water activity on glass transitions of date paste. Journal of Food Engineering, 66, 253 – 258.

Ahmed J., and Ramaswamy H.S. (2006). Physico-chemical properties of commercial date pastes (*Phoenix dactylifera*). J. Food Eng., 76: 348-352.

Al-Farsi, M., Alasalvar, C., Al-Abid, C.K., Al-Shoaily, Al-Amry, M and Al-Rawahy, F. (2007). Composition and functional characteristics of dates' syrups, and there by-products. Food Chemistry, 104: 943-947.

Al-Farisi MA and Lee CY. 2014. Enrichment of Date Paste . Journal of Nutrition & Food Science. ISSN: 2333-6706.

Alhamdan A.M., Hassan B.H. (1999). Water sorption isotherms of date pastes as influenced by date cultivar and storage temperature. J. Food Eng., 39: 301-306.

Al-Hooti, S.N., Sidhu, J.S., Al – Saqer, J.M., and Al – Othman. (2002). Chemical composition and quality of date syrup as affected by pectinase / Cellulase enzyme treatment food 9hem.., 79:215 – 220.

Al-Jasser, M. (2010). Effect of storage temperatures on microbial load of some date palm fruit sold in Saudi Arabia market. African Journal of Food Science, 4(6): 359-363.

Al-Showiman, S.S. (1998). AlTamr, Ghetha wa Saha (Date, Food and Health). Dar Al-Khareji press, Saudi Arabia.

Ali, K.T. (1985). Physiochemical Evaluation of Fruits of some Sudanese Date Palm Cultivars. M.Sc. Thesis. University of Gezira Wad Medani, Sudan.

AOAC. (1970). Association of Analytical Chemists, in the Official Method of the Association of Official Method of Chemists, 11th edition, Published by Association of Official Analytical Chemists Pobs 540, Benjamin Franklin Station, Washington.

AOAC. (1990). Methods of Analysis. Association of Official Agricultural Chemists, Washington. D. C., USA.

AOAC. (2000). Association Of Official Analytical Chemists, Official Methods of Analysis (17th Ed.). Arlington, VA. USA.

AOSC (1985). Official Tentative Methods of Analysis. 4th edition, American Oil Chemists Society. Champain, III., U.S.A.

Barreveld, W.H. 1993. Date Palm Products, FAO Agricul-tural Services Bullent No.101, Food and Agriculture Orgnaisation of the United Nations, Rome, 1993.

Besbes, S., Deroanne, C., Drira, N. and Attia, H. (2004). Date seed: chemical composition and characteristic profiles of the lipid fraction. Food Chemistry, 84:577-584.

Buchanan, R.L. and Doyle, M.P. (1997). Food borne disease significance of Escherichia coli 0157: 117 and other enterohemorrhagic *E. coli.* Food Technology. 51(10): 69 – 76.

El-Sohaimy, S.A. and Hafez, E. E.. (2010). Biochemical and nutritional characterizations of date palm fruits (Phoenix dactylifera L.) Journal of Applied Sciences Research, 6(8): 1060-1067, 2010.

Harrigan, W. F. and McCane, M. E. (1976). Laboratory method in food and Dairy microbiology academic press-London, U. K.

Ibnoof, S.M. (2007). Extraction of pectin from tamarind "*Tamaindus indica*" pulp and its use in jam production. M.Sc. Thesis. Faculty of Engineering and Technology. University of Gezira. Sudan.

Ismail, M. M. Al-Dirbak B. A. and Al-Ogaili, F.(1986). Morphological and Chemical Properties of Date Palm Cultivars Grown in Tripoli," *Proceedings of* 2*nd Symposium on the Date Palm*, Al-Hassa, 3-6 March 1986, pp. 305- 310.

Khattab, A.G.H., Eltinay A.H. and Nour, A.A.M. (1982). The chemical composition of some date palm. Al-Hassa, Kingdom of Saudi Arabia. Paper.

Larmond, E. (1982). Laboratory Methods for Sensory Evaluaion of Food. Research Branch, Canada Department of Agricultural Publication 1936 Ottawa, Canada.

Mrabet, A, Mokhtar Refil, M., Lachiheb, B.CHIHEB1, Peter Toivonen, P., Chaira, N. and Ferchchi H., 2008. Microbiological and chemical characterisations of organic and conventional date pastes (*Phoenix dactylifera* L.) from Tunisia. Annals of Microbiology, 58 (3) 453-459 (2008) ournal of Human

Nour, A.A.M. and Ahmed, A.R. (1981). Physico-chemical composition of common Sudanese date cultivars and their suitability for jam making. Iraq Date Palm J. 1(1): 99 – 106.

Nour, G.M., Khalifa, A.S, Hussein A.A. and Moustafa, A.A.(1986). Studies on the Evaluation of Fruit Characteristics on Nine Dry Date Palm Cultivars Grown at As-wan," *Proceedings of* 2*nd Symposium on the Date Palm*, Al-Hassa, 3-6, pp. 163-170.

Selim, H.H. A., Mahdi M. A. M. and El-Hakeem, M. S. (1970) "Studies on the Evaluation of Fifteen Local Date Culti-vars Grown under Desert Conditions in Siwa Oasis, UAR," *Bulletin of Egypt*, Vol. 111, pp. 137-155.

Sulieman, A.E.; Saleh, Z.A. and Alssed, A.A. (2007). Use of some Sudanese Local Varieties Date Palm in Manufacturing of Date's Honey for Consumption and Exportation. Proc. Of 4th sypm. On Date palm: 385 Al-Hassa, Saudi Arabia.

Sulieman, A.E., Itimad A. Abd Elhafise, Awad M. Abdelrahim. (2012). Comparative Study on Five Sudanese Date (*Phoenix dactylifera* L.) Fruit Cultivars. *Food and Nutrition Sciences*, 2012, 3, 1245-1251

Tang Z.X, Shi LE and Aleid S.M. (2013). Date fruit: chemical composition, nutritional and medicinal values, products.J Sci Food Agric. 2013 Aug 15;93(10):2351-61

Takrouni, R.M. (2005). Production of Date and it's Utilization in Bread Making. M.Sc. Thesis, University of Khartoum, Sudan.

Yousif, A.K., Morton, I.D. and Mustafa, A.I. (1990). Processing, evaluation and water relation of date paste. Sci. J. (in press).

تصنيع وتقييم جودة معجون من تمر الجاوا

اشراق صلاح بشرى[1] ، عبد المنعم الهادي سليمان[2]، آمنه آدم أبوالرجال[1] وحسن علي مضوي[3]

وهي الجاوا الحمراء والجاوا السوداء، يهدف هذا البحث الى دراسة ملائمة إنتاج معجون البلح من أصناف تمور محلية سودانية حيث تم إجراء التحليل الفيزيائي والكيميائي على عينات ثمار البلح قبل انتاج المعجون، بالإضافة الى ذلك تم إجراء الاختبارات الكيميائية والميكروبية والحسية على معجون البلح. أشارت نتائج التحليل الكيميائي الى زيادة نسبية لمحتوى الرطوبة في معجون الجاوا الحمراء 23.34% مقارنة بمعجون التمر من الجاوا السوداء 20.35%، محتوى الرماد في معجون الجاوا الحمراء ومعجون الجاوا السوداء 1.15% و 1.09% على التوالي، نسبة البروتين في معجون الجاوا الحمراء ومعجون الجاوا السوداء 1.75% و 2.09% على التوالي، المواد الصلبة الكلية في معجون الجاوا الحمراء ومعجون الجاوا السوداء وجدت 71.5% و 73.9% على التوالي، الحموضة الكلية في معجون الجاوا الحمراء ومعجون الجاوا السوداء وجدت 0.31% و 0.41% على التوالي. الأس الهيدروجيني 5.13 و 5.35 في معجون الجاوا الحمرا والسوداء على التوالي. أظهرت نتائج التحليل الميكروبي لعينات معجون البلح مستويات منخفضة للعد الميكروبي الكلي. التحليل الحسي أشار الى القبول المرتفع لمعجون البلح. توصي الدراسة باستخدام عينات البلح منخفضة الجودة مثل الجاوا في إنتاج منتجات عديدة وذلك لرفع قيمتها الاقتصادية.