Chemical, Microbiological and Sensory Studies on Orange Nectars and their Blends

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Abstract :

Fruit juice contains vitamins that promote the health of the digestive and immune systems and protect against disease. All chemical composition were carried out include crude protein, ash, total sugars, reducing sugars, non-reducing sugars, titratable acidity, carotene and ascorbic acid. The degree of moisture was the highest in orange juice and the degree of solids was the highest in both kaki and cantaloupe juice and was 14.5 Brix and the pH was the highest in cantaloupe juice and the fiber was the highest in orange and it was 0.85%. In addition to sensory evaluation (color, Appearance, texture and odor) the degree of overall acceptability was also highest in kaki juice than in other juices.) and in addition microbiological evaluation such as (Total bacterial count, coliform group and mold and yeasts count). Also nectar was prepared from 25% (fruit) juice + 75% (Sugar solution) to obtain soluble solids (16-18%) and pH 3.5 by adding citric acid as a 50% solution (w/mg) All chemical composition, sensory evaluation and microbiological evaluation for nectar were carried out. Also nectar blends was prepared from 25% orange + 75% kaki, 25% orange + 75%carrot and 25% orange + 75% cantaloupe all

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chemical composition, microbiological evaluation and sensory evaluation were carried out.

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Introduction

Fruit juices are a common beverage among consumers because they are natural and nutritious and they play an important role in human nutrition (Mintel, 2009, 2015 and Caswell, 2009). Fruit juice is the unfermented yet fermentable –liquid obtained from the edible portion of sound sufficiently mature and fresh fruit or of fruit preserved in sound condition by suitable means like postharvest surface treatments applied in compliance with the relevant provisions of the Codex General Standard according to a more recent description by the Codex Aliment Arius Committee (CODEX STAN 247-2005). Fruit juices when consumed in moderation as part of a well-balanced diet, can help in both health and disease prevention (IFFJP, 2011). Fruit nectar is defined as the unfermented but fermentable product prepared by adding water and sugar to the fruit juice the fruit pulp of the mixture. The fruit pulp content in the final product is 25% depending on the type of fruit. There are a variety of benefits to fruit mixtures or blends such as the combination of different aromas and tastes and the amount of their nutritionally distinct components (Matsuura *et al.,* 2004).

Orange juice is one of the most commonly consumed fruit juices in the world and one of the most widely traded commodities. It accounts for 46% of global fruit juice consumption with 18,449 million liters consumed in 2013 (Markstrat, 2013). Orange juice includes ingredients other than water, such as phenolic compounds, sugars, organic acids and

several other minor con stituents (Bull *et al.,* 2004). Orange juice is popular all over the world. And it is characterized by large number of functions and qualities rich in biologically active compounds such as polyphenols, carotenoids and vitamin C (Ephrem *et al.,* 2018).

Persimmon (*Diospyros kaki Thunb*.) is a deciduous fruit commonly eaten in many countries around the world and used in ancient medicine for the treatment of various diseases such as hypertension, cough, frostbite, paralysis, burns and bleeding (Liu *et al.,* 2019). Persimmon rich in carotenoids, a source of vitamin C, bioactive compounds and dietary fiber (De Ancos, Gonzalez and Cano, 2000).

Carrot is one of the most commonly used vegetables for human nutrition. These vegetables are an excellent source of b carotene reported to prevent cancer in fact the carrots present the highest carotenoids content among food products (Zielinska and Markowski, 2012).Carrot is an important source of Pro Vitamin A and is cultivated all over the world because it is rich in carotene (Klein, Rodrlguez andConcepcion, 2015).

Cantaloupe *(Cucumis melo)* is high in dietary fiber, bioactive compounds, vitamins, and minerals like phenolic, vitamin C, carotene and potassium (Maietti *et al.,* 2012).

The objectives of the present work were: To make different types of juices, nectars and nectar blends to benefit from their nutritional value and increase their marketing as well and study the chemical composition, sensory evaluation and microbiological evaluation.

Materials and method

Materials

Orange, kaki, and cantaloupe were obtained from Kaha Company, Kaha, Qalyabia governorate, Egypt. Other raw materials used in preparation of purée and nectars were purchased from local market, Benha, Qalyabia governorate, Egypt.

Chemicals that used in chemical, microbiological analysis were obtained from El-Gomhoria Company for trading Drugs, Chemicals and Medical Requirements.

Preparation of apricot puree

The balady variety was washed and handly cut into havels by knives.

The juice was extracted by press within the extraction machine. The extracted juice was strained to remove the seeds and other undesirable particles. The obtained was juice chemically analyzed and remaining juice was packaged in polyethylene and stored at-18^{o}C for further processing.

Preparation of kaki puree

The fruits of kaki were washed, peeled by knives, sliced, then removed; the slices were pulped by blender. The puree was strained to remove undesirable particles. The obtained pulp was chemically analyzed and remaining pulp was packaged in polyethylene and stored at -18^{o}C for further processing.

Preparation of carrot puree

The whole carrot samples were throughly washed by tap-water to remove adhering dirts, the top and the marrow bottom pasts were removed and peeled with carborandum and then cut into small pieces. Carrot was extracted by juicier Blender National Made in Japan. The obtained puree was packaged in polyethyline and stored for further processing.

Preparation of cantaloupe puree

The cantaloupe fruits were washed, peeled, the seeds were the removed. And it was chopped the juice was extracted by blender flesh was diced. The juice was extracted by blender, and then filters the extracted juice. The Juice was immediately used for analysis and processing.

Preparation of nectar blends

Nectar was prepared as recommended methods described by Sharoba *et al.,* (2007) from 25% (apricot, kaki, carrot and cantaloupe) juices + 75% (Sugar Solution) to get total soluble solids (16 –18%) pH 3.5.

The final product was filled into bottles. The bottles were sealed and sterilized at retort temperatures (95^{o}C) for held time (15 min.) and then the bottles were inverted and suddenly cooled using tap water of 24^{o}C.

The apricot nectar and other nectars were blended together as follows:

Blend (1): 25 ml orange nectar and 25 ml kaki nectar.

Blend (2): 25 ml orange nectar and 25 ml carrot nectar.

Blend (3): 25 ml orange nectar and 25 ml cantaloupe nectar.

Methods of analysis

Chemical analysis

Moisture content, total solids, fat, protein, ash, ascorbic acid, Total soluble solids, Total soluble, pH, titratable acidity, Total sugar, reducing sugar, non-reducing sugars and Crude fiber were determined according to the methods of A.O.A.C. (2000).

Total pectin content was determined by the method of Robertson (1979).

Carotenoids were determined according to Harvey and Catherine (1982).

Carbohydrate content of each fruit sample was determined by subtracting the above proximate composition values from 100 using the following formula: Carbohydrate (%) = 100-(Moisture + Protein + Fat + fiber + Ash %). Viscosity was determined using HAAKE viscometers (Haake, Mess-Technik Gmbhu. Co., Germany) Viscosity was determined in centipois (cP) unit.

Sensory evaluation:

A ten-member sensory panel conducted sensory evaluations in a standardized test. The nectars were made the day before and kept in the refrigerator. Samples were presented in glasses holding 30 ml solution at room temperature (25°C) and coded with three digit numbers. The texture (mouth feel), color, taste, flavor (odor) and general acceptance of the nectars were then evaluated. The panelists rinsed their mouths with mineral water in between tests according to Pastor *et al*. (1996).

Microbiological analysis

The following examinations were done for all formulas: Total viable bacterial count, yeasts and moulds, coliform group was detected according to the methods established by (APHA, 1992).

Statistical analysis:

The obtained data of the sensory evaluation were exposed to analysis of variance. Least significant difference (L.S.D) at 5 % level was used to compare between means. ANOVA was carried out on data of the sensory evaluation applying the function of single factors and the function of two factors with replicates "Excel" Software of Microsoft Office. Analysis was

adapted according to Gomez and Gomez (1984). Data are expressed as mean ± SE.

Results and discussion

Physicochemical Properties of Orange puree, kaki puree, carrot puree and cantaloupe puree:

The results of the physico-chemical characterization of orange puree, kaki puree, carrot puree and cantaloupe puree are shown in Table (1). The results demonstrated that the moisture content of ingredients varied from 85.45% to 86.95% in kaki, carrot and orange respectively. Carrot puree had the highest level of ash being about 0.45 % while the lowest level of ash was found in orange puree being about 0.17%. Also orange puree had the highest level of protein 0.51%. The pH value ranged from 3.65 to 4.56 for orange puree and cantaloupe puree, respectively. Titratable acidity was less than 1% except for orange puree. With regard to total sugars the data showed that the cantaloupe puree had the highest amount of total sugars17.28%. Carbohydrate ranged from 10.95 to 12.95% in orange puree and kaki puree, respectively. On the other hand orange puree had the highest level of fiber 0.85% followed by cantaloupe puree 0.81% and kaki puree 0.69%, while carrot puree had the lowest level of fiber being 0.58%. Kaki puree contained amount of carotenoids less than carrot puree. Results appeared that ascorbic acid content was ranged from 21.5 to 43 mg/100g in cantaloupe puree and carrot puree, respectively. The results of the orange puree chemical composition results were in agreement with Ahmed (2014) and Nail (2014) who found that orange contain higher amount of moisture than the other juices. The kaki puree chemical composition results were in agreement with Celik and Ercisli (2008) who studied that kaki

contain higher amount of carbohydrate than the other juices. The results of chemical composition for carrot puree used for were in agreement with those obtained by Himeda (2010), Abu El-Maaty, (2012) and Saad (2017). As the results obtained showed chemical composition results were in agreement with Abu El-Maaty (2012) who studied that cantaloupe contain more high amount of total sugar and pH than the other juices.

Table 1 Physicochemical characteristic of orange, kaki, carrot, and cantaloupe juices

Items	Unit	Fruits and vegetables juices			
	%	Orange	Kaki	Carrot	Cantaloupe
Moisture	%	86.95±0.45	85.45±0.25	85.7±0.20	85.5±0.60
Crude protein	%	0.51±0.03	0.36±0.02	0.11±0.01	0.25±0.03
Fat	%	0.15±0.015	0.11±0.01	0.07±0.01	0.17±0.015
Crude fiber	%	0.85±0.04	0.69±0.02	0.58±0.045	0.81±0.035
Ash	%	0.17±0.02	0.26±0.02	0.45±0.04	0.33±0.03
Carbohydrate	%	10.95±0.25	12.95±0.15	12.65±0.35	12±0.10
TSS	%	13.2±0.2	14.65±0.45	15.15±0.15	17.9±0.6
T.S	%	13.05±0.45	14.55±0.25	14.3±0.2	14.5±0.6
Total	%	10.39±0.0	16.375±	12.92±	17.28

sugars		8	0.18	0.18	±0.20
Reducing sugars	%	1.59±0.04	9.12±0.06	2.77±0.08	4.42±0.17
Non reducing sugars	%	8.8±0.04	7.26±0.12	10.15±0.06	12.86±0.04
PH	—	3.65±0.045	4.27±0.04	3.79±0.035	4.56±0.07
Acidity "TA"	%	1.77±0.07	0.84±0.02	0.3±0.03	0.49±0.02
TSS/TA	—	7.49±0.17	18.335±1.03	45.5±3.83	35.89±1.30
Carotene	mg%	2.16±0.07	0.12±0.02	0.95±0.03	1.76±0.11
Ascorbic acid	mg%	36.5±2.5	30.5±2.50	43±3.00	21.5±3.50
Viscosity	—	31±5.00	28.5±7.50	15.5±7.50	35±10.00

Physicochemical Properties of Orange nectar, kaki nectar, carrot nectar and cantaloupe nectar

The results of the physico-chemical characterization of orange nectar, kaki nectar, carrot nectar and cantaloupe nectar are shown in Table (2).The results demonstrated that the moisture content of ingredients varied from 85.6 % to 87.9% in kaki nectar and cantaloupe nectar respectively. Kaki nectar had the highest level of ash being about 0.77% while, the lowest level of ash was found in cantaloupe nectar being about 0.21 %.

Also, kaki nectar had the highest level of protein 0.68%. The pH value ranged from 3.72 to 4.96% for cantaloupe nectar and orange nectar, respectively. Titratable acidity was less than 1% except for carrot. With regard to total sugars the data showed that the carrot nectar had the highest amount of total sugars18.09%. Carbohydrate ranged from 11.55 to 13.3 % in orange nectar and carrot nectar, respectively. On the other hand orange nectar had the highest level of fiber 1.44% followed by kaki nectar1.4 % and cantaloupe nectar 0.89%, while carrot nectar had the lowest level of fiber being 0.85%. Kaki nectar contained amount of carotenoids less than carrot nectar. Results appeared that ascorbic acid content was ranged from 21.5 to 69.5 mg/100g in carrot nectar and orange nectar, respectively. The results chemical composition obtained were agreed with Hasim, *et al.,* (2009) who formed that orange contain higher amount of fiber and pH than the other juices. The chemical composition of kaki results were in agreement with El-Celik and Ercisli (2008) who showed that kaki contain higher amount of fat, carotene and ash than the other juices. The results of chemical composition for carrot puree used for were in agreement with those obtained by Himeda (2010), Abu El-Maaty, (2012) and Saad (2017). The results of cantaloupe chemical composition were in agreement with Abu El-Maaty (2012) and Nail (2014).

Table 2 Physicochemical characteristics of fruits and vegetables nectar at zero time

Items	Unit	Fruits and vegetables juices			
	%	Orange	Kaki	Carrot	Cantaloupe
Moistur	%	87.7±0.3	85.6±0.40	86.2±0.	87.9

e		0		30	±0.25
Crude protein	%	0.74±0.03	0.68±0.02	0.27±0.02	0.54±0.02
Fat	%	0.18±0.05	0.19±0.01	0.18±0.01	0.17±0.02
Crude fiber	%	1.44±0.08	1.403±0.31	0.85±0.04	0.89±0.04
Ash	%	0.36±0.04	0.77±0.02	0.37±0.04	0.21±0.04
Carbohydrate	%	11.55±0.35	11.95±0.35	13.3±0.40	12.3±0.35
TSS	%	15.5±0.40	14.8±0.40	18.1±0.30	13.3±0.40
T.S	%	13.55±0.55	15.15±0.25	15.55±0.36	15.45±0.45
Total sugars	%	9.5±0.05	10.99±0.18	18.09±0.04	11.58±0.07
Reducing sugars	%	2.83±0.11	2.85±0.16	5.55±0.43	1.8±0.15
Non reducing sugars	%	7.66±0.46	8.6±0.42	13.1±0.15	10.06±0.13
PH	—	4.96±2.16	3.91±0.3	3.94±0.26	3.72±0.17
Acidity "TA"	%	2.66±0.33	2.45±0.29	0.79±0.25	1.91±0.10
TSS/T	—	6.91±0.3	7.14±0.39	33.09±	7.7±0.52

A		3		0.13	
Carotene	mg%	1.67±0.44	8.9±0.60	2.04±0.23	2.7±0.52
Ascorbic acid	mg%	69.5±0.5	4.5±0.5	21.5±0.5	38±1
Viscosity	—	25.47±0.45	27.5±0.50	36.5±0.50	31.4±0.40

** Each value is the average of three replicates ± S.E.*

Physicochemical Properties of orange nectar and nectar blends at zero time

The results of the physico-chemical characterization of orange nectar with kaki nectar, carrot nectar and cantaloupe nectar are shown in Table (3).The results demonstrated that the moisture content of ingredients varied from 86 % to 87.77 % in orange with kaki nectar and orange with cantaloupe nectar respectively. Orange with kaki nectar had the highest level of ash being about 0.67% while the lowest level of ash was found in orange with cantaloupe nectar being about 0.31 %. Also orange with carrot nectar had the highest level of protein 0.69%. The pH value ranged from 3.66 to 3.81% for orange with carrot nectar and orange with kaki nectar, respectively. With regard to total sugars the data showed that the orange with kaki nectar had the highest amount of total sugars11.76%. Carbohydrate ranged from 11.75 to 11.96 % in orange with cantaloupe nectar and orange with carrot nectar, respectively. On the other hand orange with cantaloupe nectar had the highest level of fiber 1.28 % followed by orange with kaki nectar1.25 % while orange with carrot nectar had the lowest level of fiber being 1.18%. Results appeared the ascorbic acid content was ranged from 2 to 6 mg/100g in orange with carrot

nectar and orange with cantaloupe nectar, respectively. The results of chemical composition for blends used for were in agreement with those obtained by Ahmed (2006), Abu El-Maaty (2012) Tasnim *et al.*, (2010) and Nail (2014).

Table 3 Physicochemical characteristics of orange nectar and nectar blends at zero time

Items	Unit	Fruits and vegetables juices		
	%	Orange with kaki	with carrot Orange	Orange with cantaloupe
Moisture	%	87.1±0.15	86±0.20	87.77±0.25
Crude protein	%	0.7±0.10	0.69±0.01	0.67±0.02
Fat	%	0.16 ±0.02	0.18±0.02	0.15±0.02
Crude fiber	%	1.25±0.04	1.18±0.03	1.28±0.04
Ash	%	0.38±0.05	0.67±0.04	0.31±0.04
Carbohydrate	%	11.95±0.25	11.96±0.45	11.75±0.35
TSS	%	16.05 ±0.45	14.85±0.25	14.85±0.35
T.S	%	13.85±0.35	14.5±0.30	13.4±0.30
Total sugars	%	11.76±0.13	10.81±0.30	10.11±0.14
Reducing sugars	%	3.29±0.32	2.77±0.21	2.5±0.38
Non reducing sugars	%	8.9±0.23	8.2 ±0.25	8.21±0.36

PH	—	3.81±0.29	3.66± 0.13	3.8± 0.31
Acidity "TA"	%	2.21±0.31	2.56± 0.38	2.42±0.23
TSS/TA	—	8.40± 0.19	7.05± 0.31	7.03±0.29
Carotene	mg%	2.24± 0.74	7.28± 0.47	1.98± 0.47
Ascorbic acid	mg%	57.5± 0.5	20±1	6±1 1
Viscosity	—	27.65± 0.65	26.55± 0.55	27.45± 0.45

** Each value is the average of three replicates ± S.E.*

Physicochemical Properties of Orange nectar, kaki nectar, carrot nectar and cantaloupe nectar after three month

The results of the physico-chemical characterization of orange nectar, kaki nectar, carrot nectar and cantaloupe nectar are shown in Table (4).The results demonstrated that the moisture content of ingredients varied from 84.8 % to 87.7 % in kaki nectar and cantaloupe nectar respectively. Kaki nectar had the highest level of ash being about 0.78% while, the lowest level of ash was found in cantaloupe nectar being about 0.18 %. Also, orange nectar had the highest level of protein 0.7%. The pH value ranged from 4.2 to 4.78 % for carrot nectar. With regard to total sugars the data showed that the carrot nectar had the highest amount of total sugars18.3%. Carbohydrate ranged from 11.8 to 13.5 % in orange nectar and carrot nectar, respectively. On the other hand kaki nectar had the highest level of fiber 2.8% followed by orange nectar1.56% and cantaloupe nectar 1.15%, while carrot nectar had the lowest

level of fiber being 1.08%. Orange nectar contained amount of carotenoids less than carrot nectar. Results appeared that ascorbic acid content was ranged from 18.6 to 56.48 mg/100g in carrot nectar and orange nectar, respectively. The results of chemical composition for nectars used for were in agreement with those obtained by El-Mansy *et al.*, (2005), Ramulu and Rao (2003), Bahlol *et al.*, (2007) and Thongsombat *et al.*, (2007).

Table 4 Physicochemical characteristics of fruits and vegetables nectar after three month

Items	Unit	Fruits and vegetables nectar			
	%	Orange	Kaki	Carrot	Cantaloupe
Moisture	%	87.55±0.45	84.8±0.3	85.58±0.35	87.7±0.30
Crude protein	%	0.7±0.02	0.68±0.04	0.26±0.03	0.54±0.03
Fat	%	0.3±0.20	0.19±0.02	0.17±0.02	0.16±0.02
Crude fiber	%	1.56±0.03	2.8±72.02	1.08±0.01	1.15±0.02
Ash	%	0.33±0.04	0.78±0.04	0.39±0.07	0.18±0.0
Carbohydrate	%	11.8±0.60	11.87±0.45	13.05±0.45	12.25±0.45
TSS	%	14.9±0.40	14.6±0.6	17.79±0.45	12.65±0.35
T.S	%	13.37±0.45	15.9±0.36	15.17±0.35	14.1±0.50

Total sugars	%	9.72±0.40	10.81±0.4	18.13±0.27	11.81±0.51
Reducing sugars	%	2.68±0.45	2.94±0.3	5.6±0.53	1.99±0.41
Non reducing sugars	%	7.70±0.55	8.77±0.66	13.17±0.35	10.03±0.27
PH	—	4.29±0.41	4.59±0.54	4.78±0.56	4.2±0.23
Acidity "TA"	%	3.78±0.52	3.18±0.2	1.91±0.53	3±0.52
TSS/TA	—	4.98±0.50	7.19±0.47	13.29±0.46	5.14±0.18
Carotene	mg%	1.76±0.59	2.18±0.3	1.91±0.32	2.15±0.25
Ascorbic acid	mg%	56.48±0.45	36.8±0.65	18.6±0.60	33.5±0.50
Viscosity	—	27.45±0.45	29.55±0.55	39.2±0.20	35.1±0.10

** Each value is the average of three replicates ± S.E.*

Physicochemical Properties of orange nectar and nectar blends after three months

The results of the physico-chemical characterization of orange nectar with kaki nectar, carrot nectar and cantaloupe nectar are shown in Table (5).The results demonstrated that the moisture content of ingredients varied from 85.5 % to 87.6 % in orange with carrot nectar and orange with cantaloupe nectar respectively. Orange with carrot nectar had the highest level of ash being about 0.77% while, the lowest level of ash was found in orange with cantaloupe nectar being about 0.29%. Also,

orange with cantaloupe nectar had the highest level of protein 0.7 %. The pH value ranged from 4.12 to 4.67% for orange with kaki nectar and orange with carrot nectar, respectively. With regard to total sugars the data showed that the orange with kaki nectar had the highest amount of total sugars11.9 %. Carbohydrate ranged from 11.8 to 12% in orange with cantaloupe nectar and orange with kaki nectar, respectively. On the other hand orange with kaki nectar had the highest level of fiber 1.65 % while orange with carrot nectar had the lowest level of fiber being 1.38%. Results appeared that ascorbic acid content was ranged from 13.92 to56.2 mg/100g in orange with carrot nectar and orange with cantaloupe nectar, respectively. The results of chemical composition for blends used for were in agreement with those obtained by Ding and Shah (2008) and Fonteles *et al.*, (2013).

Table 5 Physicochemical characteristics of orange nectar blends after three months

Items	Unit	Fruits and vegetables nectar		
	%	Orange with kaki	Orange with carrot	Orange with cantaloupe
Moisture	%	86.65± 0.35	85.5±0.40	87.6±0.60
Crude protein	%	0.6±0.03	0.7±0.03	0.67±0.03
Fat	%	0.15±0.02	0.17±0.03	0.12±0.03
Crude fiber	%	1.65±0.25	1.38±0.01	1.54±0.02
Ash	%	0.39±0.	0.77±0.15	0.29±0.03

		07		
Carbohydrate	%	12±0.40	11.9±0.40	11.8±0.60
TSS	%	15.95±0.55	14.8±0.50	14.95±0.65
T.S	%	14.2±0.50	15.27±0.35	13.47±0.45
Total sugars	%	11.9±0.53	10.89 ±0.62	10±0.33
Reducing sugars	%	2.95±0.12	2.9±0.50	2.02±0.12
Non reducing sugars	%	8.82±0.28	8.0± 0.21	8.17±0.28
PH	—	4.12±0.13	4.67±0.58	4.14±0.37
Acidity "TA"	%	3.04±0.21	3.63±0.34	3.69±0.52
TSS/TA	—	6.01±0.57	4.80± 0.43	4.86±0.36
Carotene	mg%	1.81±0.52	6.89±0.37	1.85±0.33
Ascorbic acid	mg%	51.65±0.65	31.92±4.87	56.2±0.20
Viscosity	—	30.65±0.60	27.5±0.50	29.7±0.70

** Each value is the average of three replicates ± S.E.*

Microbiological evaluation of Orange puree, kaki puree, carrot puree and cantaloupe puree

The overall bacteriological status of the formulas was observed to be satisfactory. The obtained results revealed that the total viable bacterial count was $0.2x10^2$ and $70\ x10^2$ CFU/g for cantaloupe puree and kaki puree respectively as indicated in Table (6). However, yeasts and moulds and coliform group, were not found to be zero in all the formulas. The microbial evaluation all juices treatment in the permissible limits as recommended by (Egyptian Standard Specification (ESS), No, 416-2, 2008). Also the results obtained are consistent with (Splittstoesser, 1996).

Table 6 Microbiological quality of fruits and vegetables juices (cfu/ml).

Samples	TVBC*	Y&M**	Coliform group
Orange	$6\ x10^2$	ND	ND
Kaki	$70\ x10^2$	ND	ND
Carrot	$0.5x10^2$	ND	ND
Cantaloupe	$0.2x10^2$	ND	ND

* (TVBC) Total viable bacterial count

** Yeasts and moulds

Microbiological quality of fruits and vegetables nectars and nectar blends during storage

The overall bacteriological status of the formulas was observed to be satisfactory. The obtained results revealed that the total viable bacterial count was > 10^2 and 6 x 10^4 CFU/g for orange nectar, Orange 25% + kaki 75%,25% + carrot 75% Orange, Orange 25% + cantaloupe 75% at zero time and kaki nectar after three months respectively as indicated in Table (7). However, yeasts and moulds and coliform group, aurous were found to be absent in all the formulas in all the formulas. The microbial evaluation all nectars treatment in the permissible limits as recommended by (Egyptian Standard Specification (ESS), No, 416-2, 2008). It seems that the microbiological consistency of all prepared formulations is in accordance with these regulations. This result may be agreement with Ali (2011) and Abu El-Maaty (2012) indicated that, the total viable bacterial count was 53 and 60 cfu/g for papaya juice and papaya nectar. Also, the evaluation of the overall microbial counts, yeasts, molds and coliform correspondingly.

Table 7 Microbiological quality of fruits and vegetables nectars and nectar blends during storage

Storage period	Nectars and nectar blends	TVBC*	Y&M**	Coliform group
zero time	Orange	> 10^2	1 x 10^2	> 10^2
	Kaki	7 x 10^2	1 x 10^3	3 x 10^2

	Carrot	5×10^2	8×10^2	3×10^2
	Cantaloupe	3×10^2	6×10^2	$> 10^2$
	Orange 25% + kaki 75%	$> 10^2$	2×10^2	$> 10^2$
	25% + carrot 75% Orange	$> 10^2$	3×10^2	$> 10^2$
	Orange 25% + cantaloupe 75%	$> 10^2$	1×10^2	$> 10^2$
After three month	Orange	1×10^3	9×10^3	$> 10^2$
	Kaki	6×10^4	1×10^5	2×10^3
	Carrot	3×10^4	8×10^4	8×10^2
	Cantaloupe	1×10^4	4×10^4	3×10^2
	Orange 25% + kaki 75%	1×10^3	5×10^3	$> 10^2$
	Orange 25% + carrot 75%	3×10^3	1×10^4	$> 10^2$
	Orange 25% +	9×10^2	4×10^3	$> 10^2$

	cantaloupe 75%			

* (TVBC) Total viable bacterial count

** Yeasts and Moulds

Sensory evaluation of orange, kaki, carrot and cantaloupe puree

Sensory evaluation is usually the final guide to quality. From the consumer's perspective; As a result, it is important to compare the juices that were used, as well as organoleptic factors that reflect the juice's acceptance. The consistency, color, taste, odor, and general acceptability of various orange, kaki, carrot and cantaloupe purees were tested organoleptic ally, and the results are provided in Table (8). When compared to the other fruit purees, the results in Table (8) showed that kaki puree got the best results. Analysis of variance for data of sensory evaluation for juices formulas evaluated by people indicated that there are no significant differences (P> 0.05). The averages of the obtained scores were in the range from 7.87 to 8.19.These means that all the prepared juices formulas were accepted by the people without significant differences. The results of Sensory properties for puree used for were in agreement with those obtained by Sharoba *et al.*, 2009.

Table 8 Sensory evaluation of orange, kaki, carrot and cantaloupe puree

Treatments	Sensory Attributes					
	Color	Appearance	Taste	Texture	Odor	Overall acceptability

Orange	$7.43^{a}\pm 1.09$	$7.7^{a}\pm 1.32$	$6.87^{a}\pm 1.71$	$7.73^{a}\pm 1.5$	$6.99^{a}\pm 1.33$	$7.35^{a}\pm 1.56$
Kaki	$8.13^{a}\pm 0.80$	$8.08^{a}\pm 0.53$	$8.19^{a}\pm 1.05$	$7.72^{a}\pm 1.06$	$7.87^{a}\pm 0.96$	$8.12^{a}\pm 0.77$
Carrot	$7.9^{a}\pm 1.36$	$8.07^{a}\pm 1.52$	$7.77^{a}\pm 1.47$	$7.66^{a}\pm 1.33$	$8.03^{a}\pm 1.39$	$7.9^{a}\pm 1.37$
Cantaloupe	$7.88^{a}\pm 0.6$	$7.93^{a}\pm 0.85$	$7.59^{a}\pm 0.64$	$7.98^{a}\pm 0.16$	$8.05^{a}\pm 0.67$	$7.82^{a}\pm 0.64$
L.S.D at P<0.05	0.8824479	0.925238	1.164333	0.961599	1.0293	0.950982

Values represent of 12 panellists (Mean $\pm$S.E.)

a, b, c There is no significant difference ($p\geq 0.05$) between any two averages of different juice have the same superscripts, within the same acceptaptability attribute.

Sensory properties of orange nectar and nectar blends during storage period

Blending nectars could be a cost-cutting measure as well as a way to improve the aesthetic, nutrition, and flavor. From the consumer's perspective, sensory evaluation is usually the final guide to quality. As a result, it is beneficial to compare the nectars that were used, as well as organoleptic characteristics that reflect the acceptance of nectar. The consistency, color, taste, odor, and general acceptability of various orange, kaki, carrot and cantaloupe nectars and nectar blends during storage period.The results are presented in Table (9) significant

differences among tested nectars and blends nectar. Results reflect that the consistency of nectars (Orange 25%+ Kaki 75%) had the highest scores compared with the other nectars.

Table 9 Sensory properties of orange nectar and nectar blends during storage period

Storage period	Treatments	Sensory properties				
		Color	Taste	Odor	Texture	Overall acceptability
Zero Time	Orange	10^{b}±0.00	9.7^{a}±0.67	9.8^{a}±0.63	10^{a}±0.00	9.75^{a} ±0.6
	Kaki	10^{a}±0.00	9.8^{a}±0.42	10^{a}±0.00	10^{a}±0.00	9.8^{a}±0.42
	Carrot	10^{a}±0.00	9.65^{a}± 0.58	9.4^{a}±0.97	10^{a}±0.00	9.45^{a}±0.5
	Cantaloupe	10^{a}±0.00	10^{a}±0.00	10^{a}±0.00	10^{a}±0.00	10^{a}±0.00
	Orange 25%+ Kaki 75%	10^{a}±0.00	9.5^{a}±0.58	9.9^{a}±0.32	10^{a}±0.00	9.6^{a}±0.5
	Orange 25% + Carrot 75%	9.9^{b}±0.32	8.9^{b}±1.10	9.7^{a}±0.48	9.8^{a}±0.42	9.1^{a}±0.7
	Orange 25% + Cantaloupe	10^{a}±0.00	9.45^{a}± 0.60	9.8^{a}±0.42	10^{a}±0.00	9.5^{a}±0.53

	75%					
After3 month	Orange	8.7^{a}±0.35	7.35^{a}± 0.34	7.45^{a}± 0.37	8.4^{a}±0.39	8^{a}±0.24
	Kaki	8.85^{a}± 0.53	7.6^{a}±0.39	7.5^{a}±0.41	8.2^{a}±0.35	8.05^{a}±0.2
	Carrot	8.7^{a}±0.35	7.35^{a}± 0.41	7.4^{a}±0.46	8.3^{a}±0.35	7.75^{a}±0.26
	Cantaloupe	8.8^{a}±0.54	7.5^{a}±0.41	7.35^{a}± 0.47	8.3^{a}±0.35	7.9 ^{a}±0.39
	Orange 25%+ Kaki 75%	8.1^{a}±0.61	7.35^{a}± 0.53	7.2^{a}±0.35	7.8^{a}±0.42	7.75^{a}±0.26
	Orange 25% + Carrot 75%	8^{a}±0.58	7.5^{a}±0.58	7.15^{a}± 0.34	7.75^{a}± 0.26	7.55^{a}±0.16
	Orange 25% + Cantaloupe 75%	8.2^{a}±0.71	7.45^{a}± 0.50	7.3^{a}±0.35	7.75^{a}± 0.49	7.7^{a}±0.42

Values represent of 12 panellists (Mean ±S.E.)

a, b, c There is no significant difference ($p \geq 0.05$) between any two averages of different juice have the same superscripts, within the same acceptaptability attribute.

Conclusions

This study demonstrated that juices and nectars contain high nutrition value and rich in different types of beneficial

ingredients known as antioxidants and mineral vitamins. And it was done too to evaluate the chemical composition and microbiological and sensory of orange, kaki, carrot and cantaloupe puree, nectars and blends of orange nectar with kaki, carrot and cantaloupe nectar.

References:

Abu El-Maaty, A.S.M (2012). Studies on quality properties of some fruit juices. M.Sc. Thesis, Fac.of Agric., Benha Univ., Egypt.

Ahmed, M. Y. (2014). Chemical, microbiological and nutritional evaluation of some local produced natural juices. M. Sc. thesis. Fac. Agric,. Cairo, Al-Azhar University.

Ali S.; Masud T. and Abbasi K.S. (2011) Physico-chemical Characteristic+-s of apricot (Prunus armeniaca L.) grown In Northern Areas of Pakistan. Scientia Horticulturae 130 :368-392.

Anon (2001). Steady growth in European fruit juice market. Fruit process. 11(12): 494-495.

A.O.A.C. (2000): Official Methods of Analysis, 17th Ed. Association of Official Analytical Chemists, Inc. USA.

APHA (1992). Compendium of methods for the microbiological Examination of foods. Inc. American public Health Association Washington DC.

Aptekmann, N. P., & Cesar, T. B. (2013). Long-term orange juice consumption is associated with low LDL-cholesterol and apolipoprotein B in normal and moderately hypercholesterolemic subjects. Lipids in Health and Disease, 12(1), 119–129.

Bahlol, H.E.M.; Sharoba, A.M. and El-Desouky, A.I (2007) Production and evaluation of some food formulas as

Complementary food for babies using some fruits and Vegetables. Annals of Agric. Sc. Moshtohor, 45: (1) 147-168.

Brandon Gaille, 2018. 21 Mango Industry Statistics. Trends & Analysis.

Bull, M. K., Zerdin, K., Howe, E., Goicoechea, D., Paramanandhan,P., Stockman,R.,... Stewart, C. M. (2004). The effect of high pressure processing on the microbial, physical and chemical properties of Valencia and Navel orange juice. Innovative Food Science & Emerging Technologies, 5(2), 135–149.

Caswell, H. (2009). The role of fruit juice in the diet: an overview. Nutr. Bull. 34 (3), 273288.

Celik, A. and Ercisli, S. (2008). Persimmon cv. Hachiya (Diospyros kaki Thunb.) fruit: some physical, chemical and nutritional properties. International Journal of Food Sciences and Nutrition, 59(7-8), 599-606.

CODEX STAN 247 (2005). General standard for fruit juice and nectar. Available at: (accessed 01.06.17).

De Ancos, B., Gonzalez, E., & Cano, M. P. (2000). Effect of high- pressure treatment on the carotenoid composition and the radical scavenging activity of persimmon fruit purees. Journal of Agricultural and Food Chemistry, 48(8), 3542–3548.

Ding, W.K. and Shah, N.P. (2008). Survival of free and Microencapsulated probiotic bacteria in orange and apple juices.International Food Research Journal, 15 (2) 219-232.

Duke, J.A. and duCellier, J.L. (1993). CRC handbook of Alternative cash crops. Boca Rotan, FL: CRC Press.

Ephrem, E., Najjar, A., Charcosset, C., Greige- Gerges, H., 2018. Encapsulation of natural active compounds, enzymes,

and probiotics for fruit juice fortification, preservation, and processing: an overview. J. Funct. Foods 48, 65–84.

Egytian Ministry of Agriculture (2005). Cultivated area and annual production of mango fruits in Egypt,Agricultural Economic Departement, Ministry Agriculture, Cario, Egypt.

Egyptian Standard Specification (ESS), No 416-2., 2008. Biscuits, Part 2 Methods Of Testing and Analysis, Egyptian Organization for Standardization and Quality Control, Arab Republic of Egypt.

El-Mansy, H.A.; Sharoba,A.M.; Bahlol,H.EL.M.and El-Desouky,A.I.(2005).Rheologlical Properteis of Mango and papaya nectar blends. Annals of Agric. Sc., Moshtohor, 43(2): 665-686.

El-Soukkary, F.A.H.; El-Sahn, M.A. and Mohamed, H.M.A.(2000). Physico-chemical and nutritional evaluation of Mango seed Kernel and its utilization for pan bread Supplementation.

Ephrem, E., Najjar , A.,Charcosset, C.,Greige- Gerges, H.,2018. Encapsulation of natural active compounds, enzymes, and probiotics for fruit juice fortification, preservation, and processing: an overview. J. Funct. Foods 48, 65–84.

FAO Products years Report (2004): Food and Agriculture organization. Rome, Italy.

FAO (2009a). Current situation and medium-term outlook for Tropical fruits (FAO). 15/217/index.html

FAO (2009b)Trade: Crops and livestock primary, processed, FAOSTAT(FAO statistics Division). 27:1319-1342.

FAO. (2013). Food and Agriculture Organization of the United Nations.URLAccessed 15.05.15.

Fonteles,T.V.; Costa,M.G. M.;de Jesus,A.T.; Fontes, C.P. M.L.;Fernandes, F.A.N.and Rodrigues,S. (2013). Stability and quality Parameters of probiotic cantaloupe melon juice produced with Sonicated juice. Food Bioprocess Technology, 6, 2860-2869.

Food Institute (2002). The Almanac of the Canning, Freezing, Preserving Industries 2001-2002. 84th ed. Elmwood Park, NJ.

Gomez, K. A. and Gomez, A. A. (1984): Statistical procedures for agriculture research. John Wiliy and Sons Editor Inc. USA 2Ed. Chabter 3,129-184.

Gucla, K., M.AItun, M.Ozyurek, S.E.Karademir ,andR.Rieger,M., (2006) Introduction to fruit crops. New York: Food Products Press/Haworth Press.

Hacıseferoğulları,H.,Gezer,I.,Özcan,M.M.,MuratAsma,B., 2007.Post-harvest chemical and physical–mechanical properties of some apricot varieties cultivated in Turkey. J. Food Eng.79, 364–373.

Harvey, T.C. and Catherine, G.C. (1982): Aseptically packaged papaya and guava puree: Changes in chemical and sensory quality during processing and storage. J. Food Sci., (47) 1164-1169.

Hasim Kelebek, Serkan Selli, Ahmet Canbas, Turgut Cabaroglu.(2009). HPLC determination of organic acids, sugars, phenolic compositions and antioxidant capacity of orange juice and orange wine made from a Turkish cv. Kozan. Microchemical Journal, 91, 187–192.

Himeda,O.M. (2010):Technological and chemical studies on some baby foods. Msc. Thesis, Fac. Agric,. Benha Univ., Egypt.

IFFJP (2011). International Federation of Fruit Juices Producers: 23, ed des Capucines – F 75002 Paris.

Jedele, S.; Hau,A.M. and von Oppen, M.(2003). An analysis Of the world market for manges and its importance For developing countries,In Conference on International Agricultural Research for Development.Available in Internet: 162. pdf.

Jellin, J.M.,Gregory,P.J.,Batz,F.and Hitchens.K.(2003) Pharmacist's letter/Prescriber's letter: Natural medicines Comprehensive database. 5th ed. Stockton, CA: Therapeutic Research Faculty.

Klein, C. S., & Rodriguez-Concepcion, M. (2015). Carotenoids in Carrot. In Pigments in Fruits and Vegetables (pp. 217–228).

Liu,M.,Yang,K.,Wang,J.,Zhang,J.,Qi,Y.andWei, X. (2019). Yo ung astringent persimmon tannin Acta Horticulture, Vol. 645, ISHS, Recife, Brazil, PP.93- 105.

Markstrat (2013).Consumo de suco de laranja 40 principais mercados.Retrieved from: http://www.citrusbr.com/download/ (Accessed on 02 August 2013).

Maietti et al.,2012 A.Maietti,P. Tedeschi,C. Stagno,M.Bordiga, F. Tra aglia, M. Locatelli, et al. Analytical traceability of melon (Cucumis melo var reticulatus): Proximate composition, bioactive compounds, and antioxidant capacity in relation to cultivar, plant physiology state, and seasonal variability Journal of Food Science,77(6) (2012).

Matsuura,F.C.A.U.; Folegattii, M.I.D.S.; Cardose, R.L.and Ferreira, D.C. (2004): Sensory acceptance of mixed nectar of papya, passion fruit and acerola. Sci. Agric., 61:604-608.

Mintel, (2009). The fruit juice market: an appealing squeeze. Available at: (accessed 11.05.17).

Nail, M. S. H. (2014). Studies on quality of some concentrated juices. M.Sc.Thesis, Fac., Agric, Benha Univ. Egypt. NASS-USDA, 2008 NASS-USDA Agricultural statistics National Agricultural Statistics Service, Agricultural Statistics Board, U.S. Department of Agriculture, Washington, DC (2008).

Pastor, M.V.; Costell, E. and Duran, L. (1996): Effects of Hydrocolloids and aspartame on sensory viscosity and sweetness of low calorie peach nectars. J. Texture Stud., 27; 61-79.

Ramulu,P.and Rao,P.U.(2003).Total, insoluble and solube Dietary fiber contents of Indian fruits. Journal of Food Composition and Analysis, 16: 677-685.

Robertson, G.L. (1979): The fractional extraction and quantitative determination of pectic substances in grapes and musts.

AmericanJ of Enolvool.and Viticulture, 30:182-186.

Saad, A. M. A. (2017). Studies on production, quality and characteristics of some juice blends. Ph.D. thesis. Food Technology Dep., Fac. Agric.,Benha Univ.,Egypt.

Sharoba,A.M.; Bahlol,H.E.M.and El-Desouky, A.I.(2007) Establishing a schedule to determent the optimal Thermal process time for some canned fruit products Annals of Agric. Sc.,Moshtor,Vol. 45(1):125-145.

Sharoba, A.M.(2009) Producing and evaluation of red paper Paste as new food product.Annals of Agric.Sci.,Moshtohor,Vol. 47(2): Fo.151-165.

Splittstoesser,D.F.(1996).Microbiology of fruit products. In L.P. Somogyi, H.S. Ramaswamy, and Y. H. Hui (Eds),Processing fruit: Science and technology (pp. 261-292). Basel: Technomic.

Tasnim, F.; Anwar, H.M.; Nusrath,S.; Kamal, H.M.; Lopa, D and Formuzul H.K.M. (2010).Quality Assessment of Industrially processed fruit juices Available in Dhaka city,Bangladesh.Maik Nutrition, 16 (3):431-438.

Thongsombat,W.,Sirichote, A. and Chanthachum, S. (2007). The production of juice fortified with dietar Fiber.Songklanakarin J. Sci.Technol., March, 2007, 29(Suppl. L):187-196.

Zielinska M., and Markowski M. (2012) Color characteristics of carrots: effect of drying and rehydration, International Journal of Food Properties, 15 (2), pp.450-466.

الملخص باللغة العربية :

فى هذه الدراسة تم إستخدام بعض الفاكهه والخضروات مثل البرتقال والكاكا والجزر والكانتالوب لتحضير عصائر ونكتار هذه الفاكهه بهدف إنتاجها تجاريا وإستخدامها فى الاسواق وزيادة قيمتها الغذائية.

حيث تم تحضير العصير وإختيار أنواع تقليدية مثل البرتقال والكانتالوب وغير تقليدية مثل الكاكا والجزر التى تنتج فى مصر بثمن رخيص وإنتاج وفيروتحضير خلطه من نكتار البرتقال.

فتم تحضير العصير والنكتار وإجراء جميع الإختبارات الكيميائية والميكروبيولوجية والحسية.

كما تم أيضا تحضير النكتار من ٢٥% (فواكه) عصير + ٧٥% (محلول سكرى) للحصول على المواد الصلبة الذائبة (١٦-١٨%) ودرجة الحموضة ٣.٥ باضافة حمض الستريك كمحلول ٥٠% (وزن/مجم) وتغيير قيمة الاس الهيدروجينى الى ٣.٥

وتم تحضيرخليط النكتار بنسبة ٢٥% برتقال + ٧٥% كاكا و % برتقال + ٧٥%جزر و % برتقال + ٧٥% كانتالوب واجراء ايضا نفس الإختبارات لهم.