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EFFECT OF THE ADDITION OF COMMERCIAL PECTIN AND ETHYLENE DIAMINE TETRA ACETIC ACID ON QUALITY PARAMETERS OF MANDARIN NECTARS

[38]

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ABSTRACT

Mandarin nectar is considered one of the dominant citrus beverage. It contains valuable nutrients, pleasant aroma and a vital role in human body. Quality parameters of mandarin nectars such as cloud stability, viscosity, color, and vitamin C content control the consumer acceptance of these products. The results indicated that nectar containing 30 and 40% juice gave poor vitamin C, color, aroma, taste, mouthfeel and cloud stability comparing with the nectar having 50% juice. Addition of 0.2, 0.4 and 0.6% commercial citrus pectin pronounced increase in viscosity and improved cloud stability of mandarin nectar. The addition of 0.6% pectin improved the color values of the nectar containing 50% juice after three months of storage period at room temperature. Mandarin nectar contaning 50% juice, 0.6 % pectin and 0.2 % Ethylene diamine tetraacetic acid (EDTA) had higher viscosity, cloud stability and color than that of other mandarin nectars. Sensory evaluation indicated that nectar containing 50 % juice, 0.6 % pectin and 0.2% EDTA had higher hedonic scale of organoleptic parameters after storage period at room temperature. Statistical analysis revealed that there were significant differences between the nectar containing 50 % juice, 0.6 % pectin and 0.2% EDTA and the nectar containing 50 % juice and 0.6 % pectin than nectar containing 50 % juice only (control).

Key words: Mandarin nectar, Commerical pectin, EDTA, Color, Cloud stability, Sensory evaluation

INTRODUCTION

Fruit nectar is defined as the unfermented but fermentable product which is prepared by addition of water and sugar to fruit juice, fruit juice concentrates, fruit pulp, fruit pulp concentrates or a mixture of them. Depending on the type of fruit, the fruit pulp content in the final product may vary between 25 and 50% (**Koch, 1986**).

Cloud stability of fruit nectars is an important quality characteristic which primarily governs comsumer acceptance of such products (**Zimmer, *et al* 1996; Maltschev and Mollov, 1996 and Mensah-Wilson, *et al* 2000**). They should neither have any sediment nor cream-

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phase. Besides color, the stable disribution of cloud particles in a drink represents a central quality criterion. Cloudy or pulp-containing beverages made from citrus fruits are known to be constitutionally unstable with respect to their clouds and are therefore characterized by a rapid sedmentation of the cloud particles associated with the formation of a clear serum during storage for short period. **Asker and Treptow (1992)** described the cloud substances as having four main fractions: (1) Coarsely dispersed cloud particles consisting of pulp fragments and fibers of which the particle sizes are mostly above 1.0 mm. (2) finely dispersed cloud particles made up of intact cells, cell aggregates, chromoplasts and cell wall fragments, with particle size between 1.0 to 100 μm. (3) Colloidal substances consists of pectin, hemicellulose, protein and dissolved starch with distribuation spectrum of 0.1 to 0.001 μm. (4) Emulsified substances consisting of finely dispersed lipids, cartenoids and esential oils, with distribuation spectrum of 1.0 to 0.001 μm.

Yamasaki, *et al* (1964) postulated the first model for the structure of cloud particles of apple juice. At pH < 4 the cloud particle consists of positively charged protein nucleus surrounded by a negatively charged pectin envelope. The high water binding capacity of pectin causes the adjustment of density of hydrated cloud particles to that of surrounding serum. Alteration of the hydrated envelop by ethanol (**Mizrahi and Berk, 1981**) or by pectolytic enzyme treatment (**Röcken, 1981**) leads to flocculation and sedimenation of the cloud particles.

Maintainance of stable cloud fruit juices and fruit nectars has been the subject of numerous studies during the past 50 years. To improve cloud stability, it is generally adivsable to remove coarse particles which may eventually lead to undesirable sediment formation. **Will, *et al* (1999)** and **Carle, (1999)**. **Asker *et al* (1991)** suggested that the degradation of acid soluble pectin fraction by pectinases, arabinases, galactanases, xylanases and glucanases is essential for cloud stability.On the other hand, colud stability can be enhanced by reducing the particle size of the cloud particles through homogenization treatment. Contrary to **Asker and Treptow (1992)** and **Carle, *et al* (1998)** showed that high pressure homogenization of guava, mango and banana puree causes a reduction of serum viscosity. They ascribed the observed reduction in the viscosity to disintegration of stable hydrocolloids in the serum. Particle size of less than 1.0 μm is required for stable cloud and may be obtained through homogenization (**Mensah-Wilson, *et al* 2000**).

The content of pectin in the serum of fruit juices and drinks is of utmost importance for the formation of a structured system and, therefore, the cloud stability. **Hogdson and Kerr (1991)** suggested that pectin concentration of between 0.4 to 1.0g/L are requried for the formation of a structured system in the serum. However, **Dietrich, *et al* (1996)** assumed that for the stabilization of low viscous pineapple juice a maximum of 3 g/L pectin is required. This concentration is suitable to obtain optimal serum viscosity (2.7 mm^2/S). The improved cloud stability of pulp-containing beverages by addition of pectin was due in first place to the increase in serum viscosity (**Mensah-Wilson, *et al* 2000**). They added that though the addition of pectin proved advantageous, it could however not completely prevent sedimenation of cloud particles due in part to their typically large sizes.

EDTA (Ethylene-Diamine-Tetra-Acetic acid) has been the standrad FDA-approved treatment for lead, mercury, aluminum and cadimum poisoning for more than 50 years. EDTA is also used widely as stabilizer for packged food. Minute amounts of EDTA (33-800 ppm) added to food help to preserve flavor and color and to retard spoilage and rancidity. It also improves calcium and chlosterol metabolism by elminating metallic catalysts that can damage cell memberanes by producing oxygen free radicals. EDTA has been proven to reduce plaque and restore circulation to bloked viens and arteries. The latest scientific research suggests that EDTA taken orally can help alleviate these same conditions (**Chappell and Stahl 1993; Hancke and Flytie 1993**).

The objective of the present study was to examine the effect of juice content, addition of commercial citrus pectin and EDTA on the quality parameters of mandarin nectar.

MATERIAL AND METHODS

2.1. Materials

Mandarin fruits *Citrus reticulate* were purchased from private citrus farm in Benha, Kaluobia Governorate, Egypt. The fruits were characterized by distinctive color and aroma.

- Pectin: Commercial citrus pectin (Classic CJ 201, DE 68-76%) was kindly provided by Herbstreith and Fox, Pectin Company KG, (Neuenbürg, Germany).
- Ethylene Diamine Tetra Acetic acid (EDTA) was obtained from Fluka AG Chemistry, Germany.
- Sodium benzoate and Citric acid were obtained from El-Gomhoria Medicine and Chemicals Company, Egypt.

2.2. Methods

2.2.1. Preparation of mandarin juice

The fruits were carefully washed with tap water and juice extracted by pressing using manual hydraulic press. The resultant juice was strained through two layers of cheese cloth. The juice was pasteurized at 90°C for five minutes and directly cooled to room temperature using tap water.

2.2.2. Preparation of mandarin nectars

Mandarin nectars were prepared using different juice content ranging between 30, 40 and 50% of the final nectar. Commercial citrus pectin was added to the nectar at concentration of 0.2, 0.4 and 0.6%. Additionally, the nectar formula contained 0.05% sodium benzoate as preservative and 0.3% citric acid to maintain the sugar/acid ratio at the acceptable level. Total soluble solids of mandarin nectar was adjusted at 14.0 % by sucrose solution. EDTA (0.2%) was added to mandarin nectar containing 50% mandarin juice and 0.6% pectin. The nectars were bottled in 200 ml glass bottles, which was previously sterilized by heating, then pasteurization was performed in water bath at 85°C for 60 seconds. After pasteurization, the bottles were cold directly by tap water and stored at room temperature (25°C ± 2°) for three months.

2.2.3. Analytical methods

Total soluble solids, pH value, titratable acidity, total sugars, reducing sugars and ascorbic acid were determined according the methods described by (**AOAC, 1990**). Cloud stability was measured in the separated serum at 660 nm using UV/VIS Spectrophotometer (Jenway LTD Felsted, UK) as described by **Asker and Treptow (1993)**. Viscosity of mandarin nectar was measured using a digital viscometer (Brookfield LDV-I+ viscometer, Brookfield Engineering Labs. Inc. MA. USA) at rotation speed of 100 rpm using No. 1 spindle at 25°C as described by **Yen and Lin (1996)**.

Hunter L*, a*, b* measurement

Color index values of mandarin nectars were measured at the National Research Center, Food Technology Research Laboratory, Dokki, Cairo, Egypt using a Hunter Lab model D65 color and color difference meter (CIE LAB 10° /D65). Results were expressed in Hunter L* (indicates degree of lightness), a* (redness to greenness) and b* (yellowness to blueness) values as described by **Rhim, *et al* (1989)**.

Sensory evaluation: Sensory evaluation of mandarin nectars was evaluated using a ten-point hedonic scale, (1= dislike extremely, 5= neither like nor dislike and 10 = like extremely) according to the method described by (**Larmond, 1977**). The panelists were asked to score the sample for appearance, color, taste, aroma, mouthfeel and overall acceptability.

Statistical analysis: Sensory evaluation data were statistically analyzed, using **SAS Software (1988)**. Differences were judged to be statistically significant if the associated *P* value was 0.05.

RESULTS AND DISCUSSION

Physicochemical properties of mandarin juice

Fresh mandarin juice characteristics are presented in Table (1). The results showed that mandarin juice extracted by hydraulic press was characterized by having a very strong flavor and 46% juice yield. The results also showed that mandarin juice contained 11.7% total soluble solids, 8.80% total sugars and 42.4 mg/100ml juice of ascorbic acid. Cloud stability (absorbance at 660 nm) was 1.53. These results are in agreement with that obtained by **Mohamed, (2003)**.

Table 1. Physicochemical properties of mandarin juice

Parameters	Mandarin juice
Juice yield	46.00
Moisture	87.70
Total soluble solids (°Brix)	11.70
Total sugars (%)	8.80
Reducing sugar (%)	4.83
Non-reducing sugar (%)	3.97
Titrtable acidity (%)	0.91
Ascorbic acid (mg/100 ml)	42.40
Cloud stability (A_{660nm})	1.53
Viscosity (centipoises)	nd
pH value	3.78

*nd = not determined: viscosity value was low than sensitivity of the apparatus

Effect of commercial citrus pectin on some physicochemical properties of mandarin nectar

Data presented in Table (2) show the pH value, titrable acidity, ascorbic acid content, viscosity and cloud stability of mandarin nectars without addition of citrus pectin. Nectars containing 30, 40 and 50% mandarin juice (control nectar) had pH value of 3.40, 3.34 and 3.29, titrable acidity of 0.67, 0.79 and 0.81 % and ascorbic acid content of 10.9, 13.75 and 17.24 mg /100 ml, respectively. The addition of commercial citrus pectin at concentration of 0.2, 0.4 and 0.6 % did not affect pH value, titrable acidity and ascorbic acid content of the nectar (Table 3). The changes of pH value, titrable acidity and ascorbic acid content of mandarin nectars during storage at room temperature is presented in Tables 2 and 3. The pH value and titrable acidity of mandarin nectars prepared with or without addition of commercial pectin were not influenced during storage. The content of ascorbic acid was decreased after storage at room temperature for three months. These results are in agreement with **Martin, *et al* (1995)** and **Abd El-Wahab (1994).**

Table 2. Effect of the mandarin juice level and storage period on some quality parameters of mandarin nectar

Parameters	pH value				Titrtable acidity			
Storage period (Months)	0	1	2	3	0	1	2	3
Nectar 30 % juice	3.40	3.42	3.46	3.47	0.67	0.72	0.69	0.65
Nectar 40% juice	3.34	3.37	3.38	3.48	0.79	0.74	0.72	0.69
Nectar 50% juice	3.29	3.35	3.41	3.48	0.81	0.75	0.72	0.70

Table 2. Cont.

Parameters	Viscosity				Cloud stability (A_{660nm})				Vit. C (mg/100 ml)	
Storage period (Months)	0	1	2	3.	0	1	2	3	0	3
Nectar 30% juice	nd	nd	nd	nd	0.740	0.700	0.665	0.594	10.90	7.23
Nectar 40% juice	nd	nd	nd	nd	0.799	0.758	0.701	0.630	13.75	9.79
Nectar 50% juice	nd	nd	nd	nd	0.802	0.766	0.707	0.656	17.24	12

nd = not determined: viscosity value was low than sensitivity of the apparatus

Viscosity and cloud stability of mandarin nectar were markedly affected by the addition of various concentrations of commercial citrus pectin (Table, 3). Data indicated that the viscosity increased with the level of pectin. As expected, the highest increase was observed in nectars containing 0.6% pectin. This is in harmony with results obtained by **Maltschev, *et al* (1991)** and **Will (1995)**.

Viscosity and cloud stability values of mandarin nectar having 50% mandarin juice with 0.6% pectin were 1.16 cP and 0.979(A_{660nm}), while mandarin nectar prepared without pectin addition had cloud stability of 0.656 (A_{660nm}) after storage at room temperature for three months, as was also demonstrated by (**Asker, *et al* 1991; Maltschev, *et al* 1991** and **Cameron, *et al* 2000**). Data in Table (2) also indicate that mandarin nectar containing 30% juice without the addition of pectin rapidly lost cloud during storage period followed by the nectars containing 40 and 50% juice. On the other hand, addition of pectin resulted in improved cloud stability. A relationship was established between the level of addition of commercial pectin and cloud stability and viscosity of mandarin nectars. Mandarin nectars containing 30, 40 and 50% juice without added pectin had less cloudiness during storage. The addition of 0.6% pectin to the nectars resulted in nectar having moderate viscosity and better cloud stability during and after storage period at room temperature (Table, 3). These results are in agreement with the results obtained by **Will (1995)**.

Hunter L*, a* and b* of color values were measured to evaluate the visual color changes associated with the level of the juice added as well as the addition of commercial citrus pectin. Table (4) shows the changes in color index values of mandarin nectar containing 30, 40 and 50% juice with or without pectin after storage at room temperature for three months. The L* value, which expresses the lightness of the color was increased with increase the juice level. Mandarin nectar containing 30% juice was characterized by L* value of 28.65 which increased to a value of 32.30 when 50% juice was used. The addition of pectin caused slightly increment of lightness of color. The positive a* value, which correspond to red hue, was increased from 0.25 to 2.95 for nectar containing 30% and 50% juice, respectively. The positive b* value, which is a measure of yellow hue was increased with the increase of juice level. Addition of pectin at the different levels caused reduction in b* value of the nectars containing 30 and 40% juice.

On the other hand, b* value was slightly increased when pectins was added to nectar containing 50% juice. Generally. The nectar containing 30 and 40% juice had poorer color compared with nectar containing 50% juice. Addition of citrus pectin, especially 0.6%, lead to improvement in color perception of mandarin nectar. Results obtained by **Lee and Chen (1998)** showed that the main color changes in stored clear orange juice concentrate was due to increase in b* value, which was in high correlation to browning measurement.

Effect of addition of EDTA on some physical properties of mandarin nectar

Data in Table (5) and Fig. (1) show comparison between the nectar containing 50% juice without pectin addition (control), nectar containing 50% juice

Table 3. Effect of commercial citrus pectin and storage period on some quality parameters of mandarin nectar

Parameters	pH value				Titrtable acidity			
Storage period (Months)	0	1	2	3	0	1	2	3
Nectar 30 % juice								
0.2 % pectin	3.40	3.42	3.42	3.46	0.68	0.68	0.66	0.65
0.4 % pectin	3.38	3.41	3.44	3.48	0.68	0.66	0.67	0.63
0.6 % pectin	3.38	3.38	3.40	3.45	0.70	0.70	0.65	0.62
Nectar 40% juice								
0.2 % pectin	3.34	3.37	3.38	3.43	0.79	0.76	0.73	0.69
0.4 % pectin	3.33	3.35	3.39	3.43	0.80	0.80	0.72	0.67
0.6 % pectin	3.30	3.35	3.37	3.41	0.80	0.79	0.72	0.64
Nectar 50% juice								
0.2 % pectin	3.27	3.27	3.32	3.35	0.84	0.84	0.80	0.75
0.4 % pectin	3.27	3.30	3.31	3.34	0.84	0.82	0.79	0.72
0.6 % pectin	3.25	3.26	3.28	3.31	0.85	0.82	0.80	0.75

Table 3. Cont.

Parameters	Viscosity				Cloud stability (A_{660nm})				Vit. C (mg/100 ml)	
Storage period (Months)	0	1	2	3	0	1	2	3	0	3
Nectar 30% juice										
0.2 % pectin	nd	nd	nd	nd	0.792	0.780	0.768	0.749	10.88	7.20
0.4 % pectin	nd	nd	nd	nd	0.833	0.812	0.793	0.767	10.87	7.81
0.6 % pectin	1.14	1.14	1.14	1.15	0.878	0.867	0.840	0.819	10.85	7.20
Nectar 40% juice										
0.2 % pectin	nd	nd	nd	nd	0.813	0.800	0.790	0.771	13.70	9.72
0.4 % pectin	nd	nd	nd	nd	0.889	0.878	0.861	0.842	13.73	9.70
0.6 % pectin	1.15	1.15	1.15	1.16	0.940	0.924	0.900	0.883	13.73	9.68
Nectar 50% juice										
0.2 % pectin	nd	nd	nd	nd	0.879	0.865	0.850	0.831	17.24	12.88
0.4 % pectin	nd	nd	nd	nd	1.038	0.980	0.974	0.961	17.23	12.87
0.6 % pectin	1.16	1.15	1.16	1.16	1.133	1.005	0.989	0.979	17.21	12.89

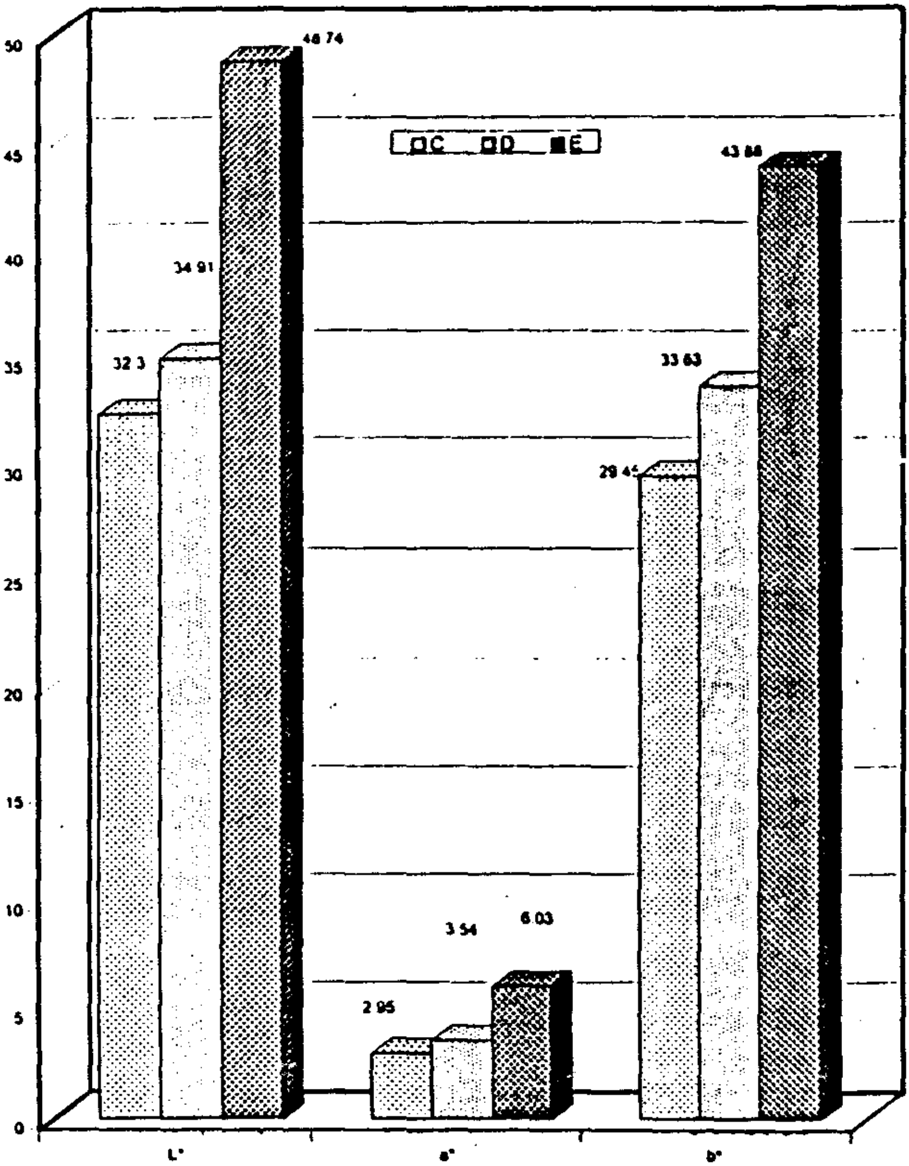
nd = not determined: viscosity value was low than sensitivity of the apparatus

Table 4. Parameters of Hunterlab of mandarin nectars containing different juice levels and pectin concentration

Juice level	30 %				40 %				50 %			
Pectin concentration	0	0.2	0.4	0.6	0	0.2	0.4	0.6	0	0.2	0.4	0.6
L*	28.65	30.26	30.97	31.89	30.61	33.55	32.66	33.54	32.30	34.59	33.51	34.91
a*	00.25	00.52	00.65	1.32	2.02	1.39	2.30	1.89	2.95	2.56	3.06	3.54
b*	24.23	21.74	22.13	22.39	27.67	25.68	25.93	27.74	29.45	30.42	32.23	33.63

Table 5. Viscosity, cloud stability and color parameters of mandarin nectars during storage period at room temperature

Parameters	Viscosity				Cloud stability (A_{660nm})				• Color parameters		
Storage period (Months)	0	1	2	3	0	1	2	3	L*	a*	b*
Nectar 50% (control)	nd	nd	nd	nd	0.802	0.766	0.707	0.659	32.30	2.95	29.45
Nectar 50% and 0.6% pectin	1.16	1.15	1.16	1.16	1.330	1.010	0.989	0.979	34.91	3.54	33.63
Nectar 50%, 0.6% pectin and 0.2% EDTA	1.76	1.75	1.76	1.76	1.534	1.530	1.530	1.527	48.74	6.03	43.88



** C = Nectar 50% juice (control) D = Nectar 50% juice and 0.6% pectin. E = Nectar 50% juice, 0.6% pectin and 0.2% EDTA

Fig.1. Effect of addition of citrus pectin and EDTA on the color parameters of mandarin nectar

and 0.6% pectin and the nectar containing 50% juice, 0.6% pectin and 0.2% EDTA during and after storage period at room temperature. Data indicated that, addition of 0.2% EDTA caused marked increase in viscosity (1.76 cP). The results also show that addition of 0.2% EDTA improved cloud stability and color values compared with the control sample after storage period.

Color parameters L*, a* and b* values of mandarin nectar containing 0.6% pectin and 0.2% EDTA were 48.74, 6.03 and 43.88, respectively. These values were significantly higher than those nectar having of 50% juice and 0.6% pectin but without EDTA which were 34.91, 3.54 and 33.63. In conclusion, results presented in this study provide evidence that mandarin nectar containing 50% juice, 0.6% pectin and 0.2% EDTA was characterized by a good appealing color, remarkable cloud stability and good organoleptic properties similar to fresh mandarin juice (Table, 6). These improvements may be due to the action of EDTA which chelate calcium ions found in the nectar, thus the pectin became more soluble and gave it chance for absorbing excessive water, forming cloud stable suspension. It is well known that pulp adsorbs aroma and flavor ingredients in the beverages. The fine particles of suspended materials are responsible for the color, appearance and much of flavor of citrus juices. (**Mills, *et al* 1992**).

The results given in Table 6 illustrates that nectar containing 50% juice (control) was characterized by higher value for appearance, color, aroma, taste, mouthfeel and overall acceptability than those containing 30% and 40% juice. The statistical analysis data show that the nectar containing 50% juice, 0.6% pectin and 0.2% EDTA was significantly different (p = 0.05) than other nectars at zero time and after storage. The aroma characteristic of the nectar containing 50% juice, 0.6% pectin and 0.2% EDTA at zero time was significantly higher (p = 0.05) than other nectars at zero time and after storage period . On the other hand, no significant difference was found in taste values of nectars containing 50% juice prepared with or without addition of pectin and EDTA. No significant difference between mouthfeel values of nectar containing 50% juice (control), nectar containing 40% juice and 0.6% pectin, nectar containing 50% juice and 0.6% pectin and nectar 50% juice, 0.6% pectin and 0.2% EDTA at zero time and after the storage period. These values were significantly higher (p =0.05) than those obtained for others nectar samples. The aroma and flavor ingredients along with the amount of pectin, pulp and fiber in beverage affect the flavor and mouthfeel characteristics of beverages (**Mills, *et al* 1992**).

Although the addition of citrus pectin to mandarin nectars was found to improve the quality parameters of the nectars. The addition of 0.2% EDTA to nectar containing 50% juice and 0.6% pectin resulted in a higher hedonic scale for the organoleptic parameters (like extremely) after 3 months storage period. The organoleptic tests are in harmony with the physico-chemical parameters of mandarin nectars. It is to be concluded that addition of pectin and EDTA to mandarin nectar proved to be advantageous in respect to quality of mandarin nectars and that permission of such addition similar to pineapple and passion fruit, should be

Table 6. Sensory evaluation of mandarin nectar products as affected with pectin and EDTA during storage at room temperature

Parameters	Appearance 10		Color 10		Aroma 10		Taste 10		Mouthfeel 10		Overall-acceptability	
Storage period (months)	0	3	0	3	0	3	0	3	0	3	0	3
Nectar 30 % Juice.	4.0^{f}	3.0^{g}	4.0^{g}	3.0^{h}	6.0^{d}	6.0^{d}	6.0^{c}	7.0^{c}	6.0^{c}	6.0^{c}	52	50
Nectar 40 % Juice.	4.0^{ef}	3.0^{g}	5.0^{f}	4.0^{g}	7.0^{c}	6.0^{d}	7.0^{c}	7.0^{c}	7.0^{c}	7.0^{c}	61	54
Nectar 50 % Juice.	5.0^{e}	5.0^{e}	6.0^{e}	6.0^{e}	8.0^{b}	7.0^{c}	9.0^{ab}	8.0^{b}	9.0^{ab}	8.0^{b}	74	68
Nectar 30% juice and 0.6% pectin.	5.0^{e}	6.0^{d}	4.0^{g}	6.0^{e}	7.0^{c}	6.0^{d}	7.0^{c}	7.0^{c}	7.0^{c}	7.0^{c}	60	64
Nectar 40% juice and 0.6% pectin.	6.0^{c}	7.0^{c}	6.0^{e}	7.0^{d}	8.0^{b}	6.0^{d}	9.0^{ab}	8.0^{b}	9.0^{ab}	8.0^{b}	76	72
Nectar 50% juice and 0.6% pectin.	7.0^{c}	8.0^{b}	8.0^{c}	8.0^{c}	8.0^{b}	6.0^{d}	9.0^{ab}	9.0^{ab}	9.0^{ab}	9.0^{an}	82	80
Nectar 50% juice, 0.6% pectin and 0.2% EDTA.	9.0^{a}	9.5^{a}	8.5^{b}	10.0^{a}	9.0^{a}	7.0^{c}	9.0^{ab}	10.0^{a}	10.0^{a}	10.0^{a}	91	93

allowed, provided that health and regulatory aspects are fulfilled.

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تأثير إضافة البكتين التجارى واثيلين داى امين تترا اسيتك اسيد على جودة مشروب اليوسفى

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يعتبر مشروب اليوسفى من أحد المشروبات الهامة المنتجة من ثمار الموالح، والذي يتميز بالقيمة الغذائية والرائحة المرغوبة و المركبات الحيوية المفيدة للجسم. وان مقاييس الجودة لمشروب اليوسفى مثل ثبات العكارة، اللزوجة ، اللون ومحتواه من فيتامين ج هى المحددة لقبول المستهلك لهذه المنتجات. ويهدف البحث الى دراسة تأثير نسبة مشاركة العصير و إضافة البكتين و اثيلين داى امين تترا اسيتك اسيد على مقاييس الجودة لمشروب اليوسفى. وقد أوضحت النتائج أن المشروب المحضر بمشاركة ٣٠% و ٤٠% عصير بدون إضافة بكتين كان فقيرا فى محتواه من فيتامين ج ، اللون، الرائحة، الطعم و القابلية العامة مقارنة بالمشروب المحضر بمشاركة ٥٠% عصير. كما أدت إضافة البكتين بنسبة ٠,٢ و ٠,٤ و٠,٦ % إلى حدوث زيادة فى الزوجة و تحسين ثبات العكارة. وان إضافة البكتين بنسبة ٠,٦% قد أدت الى تحسين قيم اللون لمشروب اليوسفى المحضر بمشاركة ٥٠% عصير والمختبر بعد ثلاث شهور من التخزين على درجة حرارة الغرفة. كما أوضحت النتائج أن مشروب اليوسفى المحضر بمشاركة ٥٠% عصير والمضاف له ٠,٦% بكتين و ٠,٢% اثيلين داى امين تترا اسيتك اسيد قد سجل أعلى القيم لكل من اللزوجة وثبات العكارة واللون مقارنة بمشروبات اليوسفى الأخرى. ولقد أوضحت نتائج التقييم الحسى أن مشروب اليوسفى المحضر بمشاركة ٥٠% عصير والمضاف له ٠,٦% بكتين و ٠,٢% اثيلين داى امين تترا اسيتك اسيد كان الأعلى فى قيمه عند التحكيم بعد ثلاث شهور من التخزين على درجة حرارة الغرفة. واضح التحليل الإحصائي لنتائج التقييم الحسى أن هناك اختلافا معنويا بين مشروب اليوسفى المحضر بمشاركة ٥٠% عصير والمضاف له ٠,٦% بكتين و ٠,٢% اثيلين داى امين تترا اسيتك اسيد و مشروب اليوسفى المحضر بمشاركة ٥٠% عصير والمضاف له ٠,٦% بكتين مقارنة بمشروب اليوسفى المحضر بمشاركة ٥٠% عصير فقط (عينة المقارنة).

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