RESULTS AND DISCUSSION

I- Dried apricot sheets (Quamar Eldin sheets):

A. *Chemical properties:*

Sun-drying of fruits is one of the oldest techniques of food preservation. So, sun drying permits one to produce a product with a rich orange color, a translucent appearance and a desirable gummy texture,... (Bolin et al., 1980).

The data presented in Table (1) show marked increase in the total sugars and reducing sugars, due to the addition of sucrose to the juice before sun drying and some hydrolysed sucrose during pasteurization and drying, leading to increases in reducing sugars. The total acidity (as citric acid) in fresh apricot juice was 2.67%, but after processed to dried sheets it was 4.1%. This increase may be due to degradation of some organic compounds to organic acids. Also it could be noticed that the pH values were slightly decreased.

From the same table, it is noticed that most of the ascorbic acid present in the fresh juice was lost during processing, this decrease may be due to oxidation of ascorbic acid during drying. The sulfur dioxide was determined before drying directly in treated juice and dried samples. Treated juice before drying contained 1168.73 p.p.m. (on dry weight basis), after drying sulfur dioxide decreased to 405.63 p.p.m. (on dry basis). The color intensity was

Table (1): Effect of drying on chemical composition of apricot juice.

Composition	Fresh juice	Normal dried sheets
Moisture %	85.40	14.00
Total solids %	14.60	86.00
Total sugars % (on dry basis)	48.97	70.12
Reducing sugars % (on dry basis)	32.19	34.28
Titratable acidity (as citric acid) %	2.67	4.10
pH value	3.40	3.20
Ascobic acid mg./100g (on dry basis)	54.93	27.33
Carotenoids mg/100g (on dry basis)*	24.7	23.72
Sulfur dioxide p.p.m. (on dry basis)	1168.73	405.63
Color index (as O.D. at 420 nm)	0.085	0.152

* Calculated as β carotene.

0.085 in fresh apricot juice, and after drying it became 0.152 as optical density at 420 nm wavelength .

The percentage of total solids in apricot is very important for processed products. After processing, different dried apricot sheets total solids content ranged from 85.5% to 87.2% (table 2), this variation in total solids may be due to the type of sweetener and unequal exposure to sun light. During storage for nine months the total solids increased slightly in all treatments. This may be due to the low level of relative humidity in the refrigerator. This result is in agreement with that obtained by Foda et al., (1972). Also the Egyptian Standard No. 1582 (1985) stated that the total solids should not be less than 82%, for normal dried apricot sheets.

Sugars such as glucose, fructose and sucrose represent the major component of total soluble solids in apricot juice. After processing the percentage of total sugars varied widely in different treatments. It ranged from 40.7 to 75.22%, this may be due to the kind and percentage of sweetener, and moisture content, (table 3). During storage for nine months the total sugars decreased. This may be due to the reaction between amino acids and sugars forming ketose amines as reported by Anet and Reynolds (1957), and/or reaction between organic acid with sugars to form monoesters (Herrmann, 1963). The total sugars decreased from 60.31 to 55.79, 75.22 to 71.97, 40.7 to 38.4, 40.7 to 38.35, 43.5 to 41.28, 57.3 to 55.23, 56.6 to 54.46 and 56.8 to 54.57% for Quamar Eldin sheets sweetened with sucrose, fructose, APM, APM + stevioside, APM +

Table (2): Effect of storage on the percentage of total solids in dried apricot sheets.

Treatments	Storage period / months			
	Zero	3	6	9
Quamar Eldin sheets sweetened with :				
Sucrose (S)	86.0	86.5	87.1	87.6
Fructose (F)	86.5	87.1	87.3	87.7
Aspartame (APM)	87.0	87.3	87.6	88.0
Aspartame (APM) + Stevioside(St)	87.2	87.5	87.8	88.1
Aspartame (APM)+ Acesulfame-K(ACK)	86.8	87.1	87.6	87.9
Aspartame (APM) + Fructose(F)	86.5	86.9	87.2	87.7
Acesulfame-K(ACK) + Fructose(F)	85.5	86.1	86.6	87.0
Stevioside (St) + Fructose(F)	85.8	86.1	86.5	86.9

Table (3). Effect of storage on the percentage of total sugars in dried apricot sheets.

Treatments	Storage period / months			
	Zero	3	6	9
Quamar Eldin Sheets Sweetened with :				
Sucrose (S)	60.31	58.14	57.35	55.79
Fructose (F)	75.22	74.05	73.24	71.97
Aspartame (APM)	40.70	39.86	39.15	38.40
Aspartame (APM) + Stevioside(St)	40.70	39.95	39.19	38.35
Aspartame (APM)+ Acesulfame-K(ACK)	43.50	42.52	41.96	41.28
Aspartame (APM) + Fructose(F)	57.30	56.72	55.97	55.23
Acesulfame-K(ACK) + Fructose(F)	56.60	55.93	55.04	54.46
Stevioside (St) + Fructose(F)	56.80	55.97	55.27	54.57

acesulfame-K, APM + fructose, acesulfame-K + fructose and stevioside + fructose, respectively. These results agree with those obtained by Nezam Eldin (1978). The Egyptian Standard No.1582 (1985) mentioned that total sugars should not be more than 70% for normal Quamar Eldin sheets.

Reducing sugars in apricot are mainly glucose and fructose as reported by Sarhan (1970) and Foda et al., (1972). After processed to different dried sheets it ranged from 27.53 to 44.25% this is due to the kind of sweeteners, (table 4). From the same table, a slight increase for different treatments during storage period can be observed. This may be due to the effect of acidity on hydrolyzing non-reducing sugars to reducing sugars, these results agree with those obtained by Nezam Eldin, (1978) and Ibrahim (1990).

Apricot contains several organic acids. It is usually calculated as citric acid. Citric acid in fruits affects both taste and keeping quality of the juice. Results in Table (5) showed that the total acidity after processing, ranged from 4.0 to 4.5% according to the treatments. During storage the decrease in all treatments was observed, this decrease may be due to the reactions between amino compounds and organic acids and/or sugar, (Herrmann, 1963). This results are in agreement with those reported by Ibrahim (1990). Also the Egyptian standard allowed the total acidity (calculated as citric acid) up to 5%.

Table (4). Effect of storage on the percentage of reducing sugars in dried apricot sheets.

Treatments	Storage period / months			
	Zero	3	6	9
Quamar Eldin sheets sweetened with : Sucrose (S)	29.48	30.59	31.80	32.00
Fructose (F)	44.25	44.57	44.87	45.06
Aspartame (APM)	27.59	27.83	28.02	28.19
Aspartame (APM) + Stevioside(St)	27.66	28.24	28.74	29.10
Aspartame (APM)+ Acesulfame-K(ACK)	27.53	27.98	28.48	28.71
Aspartame (APM) + Fructose(F)	36.99	37.21	37.50	37.68
Acesulfame-K(ACK) + Fructose(F)	36.58	36.77	36.98	37.06
Stevioside (St) + Fructose(F)	36.71	36.94	37.15	37.29

Table (5). Effect of storage on the percentage of titratable acidity* in dried apricot sheets.

Treatments	Storage period / months			
	Zero	3	6	9
Quamar Eldin sheets sweetened with :				
Sucrose (S)	4.10	3.90	3.70	3.60
Fructose (F)	4.00	3.70	3.50	3.40
Aspartame (APM)	4.40	4.00	3.70	3.50
Aspartame (APM) + Stevioside(St)	4.30	3.90	3.60	3.50
Aspartame (APM)+ Acesulfame-K(ACK)	4.50	4.10	3.80	3.60
Aspartame (APM) + Fructose(F)	4.20	4.00	3.70	3.50
Acesulfame-K(ACK) + Fructose(F)	4.00	3.70	3.50	3.40
Stevioside (St) + Fructose(F)	4.10	3.80	3.60	3.50

* Calculated as citric acid.

The pH values increased during storage period for all treatments (table, 6), these results agree with those obtained by Nezam Eldin (1978).

Ascorbic acid determination showed that ascorbic acid content in different dried apricot sheets ranged from 20.5 to 28.4 mg/100 g. (Table 7). During storage for nine months, the ascorbic acid decreased in all treatments, it decreased from 23.5 to 7.75, 20.5 to 6.34, 28.0 to 8.5, 27.9 to 7.46, 28.4 to 8.75, 23.8 to 7.07, 24.8 to 6.89 and 24.0 to 7.23 mg/100 g. for Quamar Eldin sheets sweetened with sucrose, fructose, APM, APM + stevioside, APM + acesulfame-K, APM + fructose, acesulfame-K + fructose and stevioside + fructose, respectively. This decrease may be due to oxidation of ascorbic acid which acts as an inhibitor for nonenzymatic browning. These results are in agreement with those stated by Tressler and Joslyn (1954) and Nezam Eldin (1978).

Carotenoids are pigments which directly affect the color of Quamar Eldin. Data in Table (8) represented the total carotenoids (as β-carotene) in different treatments of Quamar Eldin. Carotenoids content in different dried apricot sheets ranged from 20.0 to 21.9 mg/100 g. During storage for nine months the carotenoids were decreased. These results agree with those obtained by Foda et al., (1972).

Table (6). Effect of storage on pH values in dried apricot sheets.

Treatments	Storage period / months			
	Zero	3	6	9
Quamar Eldin sheets sweetened with :				
Sucrose (S)	3.20	3.30	3.40	3.60
Fructose (F)	3.30	3.40	3.50	3.70
Aspartame (APM)	3.00	3.20	3.40	3.60
Aspartame (APM) + Stevioside(St)	3.10	3.30	3.40	3.60
Aspartame (APM)+ Acesulfame-K(ACK)	3.00	3.20	3.40	3.50
Aspartame (APM) + Fructose(F)	3.20	3.40	3.50	3.70
Acesulfame-K(ACK) + Fructose(F)	3.10	3.30	3.40	3.60
Stevioside (St) + Fructose(F)	3.20	3.40	3.50	3.70

Table (7). Effect of storage on the ascorbic acid in dried apricot sheets (mg./100g.).

Treatments	Storage period/ months			
	Zero	3	6	9
Quamar Eldin sheets sweetened with : Sucrose (S)	23.50	15.64	10.44	7.75
Fructose (F)	20.50	13.93	9.65	6.34
Aspartame (APM)	28.00	17.52	11.24	8.50
Aspartame (APM) + Stevioside (St)	27.90	17.71	10.72	7.46
Aspartame (APM)+ Acesulfame-K (ACK)	28.40	18.16	11.94	8.75
Aspartame (APM) + Fructose (F)	23.80	15.79	9.75	7.07
Acesulfame-K(ACK) + Fructose (F)	24.80	16.55	10.31	6.89
Stevioside (St) + Fructose (F)	24.00	15.70	10.15	7.23

Table (8). Effect of storage on the carotenoids in dried apricot sheets (mg./100g.).

Treatments	Storage period/months			
	Zero	3	6	9
Quamar Eldin sheets sweetened with : Sucrose (S)	20.4	12.5	11.6	11.0
Fructose (F)	20.0	12.2	11.0	10.5
Aspartame (APM)	21.3	13.4	12.2	11.6
Aspartame (APM) + Stevioside (St)	21.0	13.0	12.1	11.4
Aspartame (APM)+ Acesulfame-K (ACK)	21.9	12.7	12.0	11.3
Aspartame (APM) + Fructose (F)	21.6	12.5	11.8	11.2
Acesulfame-K(ACK) + Fructose(F)	20.7	12.4	11.9	11.1
Stevioside (St) + Fructose(F)	20.5	12.5	11.5	10.8

Sodium metabisulfite was added to the samples as a source of sulfur dioxide, for preventing the nonenzymatic browning and the oxidation of carotenoids. After processing, different dried apricot sheets sulfur dioxide content ranged from 404.32 to 405.73 p.p.m. (on dry weight basis) (Table 9). During storage for nine months sulfur dioxide decreased, this was due to the volatile characteristic of sulfur dioxide. This result is in agreement with that reported by Ibrahim (1990). Also, this level of sulfur dioxide content in all samples agrees with the Egyptian standard No.1582 (1985) (sulfur dioxide content does not exceed 2000 p.p.m. for normal dried apricot sheets)

The color of Quamar Eldin sheets may change from attractive orange to unaccepted yellow brown which is due to browning reactions. The color index of serum extracted from different samples was measured as optical density at wave length 420 nm. Results in Table (10) showed that the color was darker in Quamar Eldin sheets sweetened with sucrose, its optical density was 0.152, whereas sample sweetened with fructose was more bright, its optical density was 0.091. These results agree with Katchalasky (1941) who mentioned that the straight chain aldoses through condensation reactions cause the melanoidin browning, whereas pure fructose dose not condense with amino compounds. Also, APM caused a slight browning in samples after drying and storage. This may be due to the conversion of APM to amino acid, which react with free sugar forming brown color (non enzymatic reaction). During storage for nine months the intensity of color increased gradually, this darkening may be due to the formation of brown pigments. These results are in agreement with those reported by Foda et al., (1972) and Ibrahim (1990).

Table (9): Effect of storage on sulfur dioxide (ppm.) in dried apricot sheets (on dry weight basis).

Treatments	Storage period/months			
	Zero	3	6	9
Quamar Eldin sheets sweetened with :				
Sucrose (S)	405.63	281.52	227.05	121.69
Fructose (F)	404.88	280.03	224.32	130.50
Aspartame (APM)	405.03	282.14	225.87	124.60
Aspartame (APM)+ Stevioside (St)	404.32	281.95	225.91	127.15
Aspartame (APM)+ Acesulfame-K (ACK)	404.52	280.62	224.96	120.37
Aspartame (APM) + Fructose (F)	405.73	282.03	226.37	122.97
Acesulfame-K(ACK)+ Fructose (F)	405.59	281.76	225.56	126.35
Stevioside (St) + Fructose (F)	405.73	281.57	227.51	129.05

Table (10): Effect of storage on the color index (as O.D. at wavelength 420 nm.) in dried apricot sheets.

Treatments	Storage period / months			
	Zero	3	6	9
Quamar Eldin sheets sweetened with : Sucrose (S)	0.152	0.184	0.235	0.289
Fructose (F)	0.091	0.104	0.109	0.115
Aspartame (APM)	0.115	0.123	0.127	0.135
Aspartame (APM) + Stevioside(St)	0.109	0.115	0.120	0.127
Aspartame (APM)+ Acesulfame-K (ACK)	0.108	0.117	0.121	0.125
Aspartame (APM) + Fructose(F)	0.106	0.113	0.117	0.122
Acesulfame-K (ACK) + Fructose(F)	0.098	0.109	0.114	0.118
Stevioside (St) + Fructose(F)	0.096	0.103	0.108	0.116

Data from Table (11) showed that the arsenic, lead and copper contents in all treatments, were less than those mentioned by the Egyptian Standard No. 1582 (1985) which stated that the arsenic, lead and copper should not exceed 0.1, 2.0 and 10.0 p.p.m., respectively.

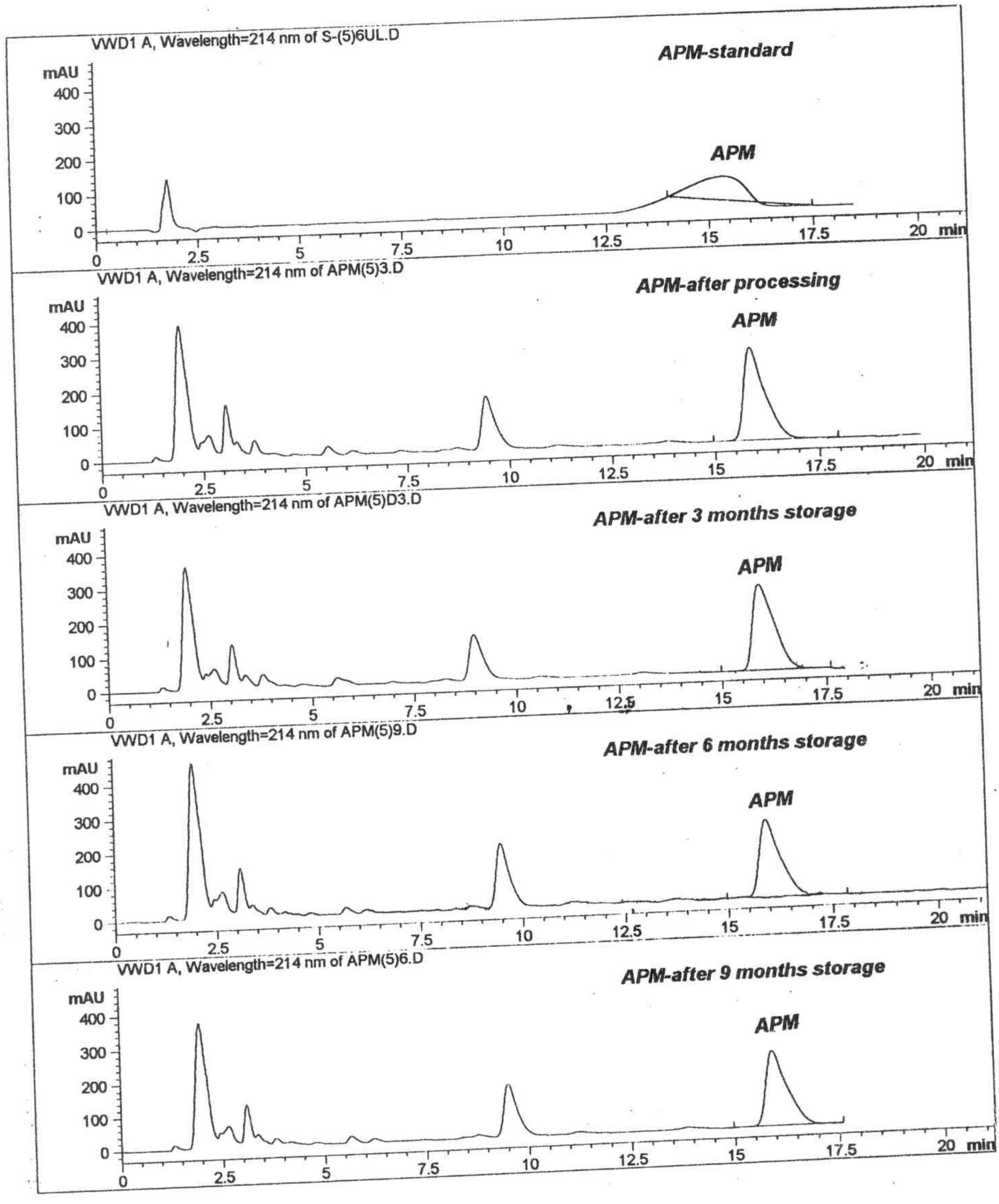
Table (12): Effect of processing and storage on the degradation of APM in dried apricot sheets sweetened with APM.

	Standard	Storage period/month			
		Zero	3	6	9
APM %	0.056	0.0507	0.0482	0.0432	0.0419
Decrease percentage	--	9.4	13.9	22.8	25.1

It could be noticed from Table (12) and figure (2) that APM percentage in dried apricot sheets sweetened with APM decreased gradually after processing and during storage and the percentage of APM degradation after processing was 9.4. This may be due to the effect of processing wherever, APM is converted to its derivative. The effect of storage period (3, 6 and 9 months) showed that the APM degradation was 13.9, 22.8 and 25.1%, respectively.

Table (11): The mineral content in dried apricot sheets (calculated as p.p.m.).

Treatments	Minerals		
	As	Pb	Cu
Quamar Eldin sheets sweetened with :			
Sucrose (S)	0.068	1.410	8.650
Fructose (F)	0.063	1.300	7.360
Aspartame (APM)	0.049	1.130	6.720
Aspartame (APM) + Stevioside (St)	0.050	1.200	6.870
Aspartame (APM)+ Acesulfame-K (ACK)	0.052	1.070	6.400
Aspartame (APM) + Fructose (F)	0.056	1.210	6.790
Acesulfame-K (ACK) + Fructose (F)	0.058	1.180	6.700
Stevoside (st) + Fructose (F)	0.055	1.290	7.080



(Fig. 2): Chromatograms of standard APM , after processing and during storage on dried apricot sheets sweetened with APM.

Table (13): Effect of processing and storage on the degradation of APM in dried apricot sheets sweetened with APM +F.

	Standard	Storage period/month			
		Zero	3	6	9
APM %	0.028	0.0259	0.0245	0.0225	0.0191
Decrease percentage	--	7.5	12.5	19.7	31.8

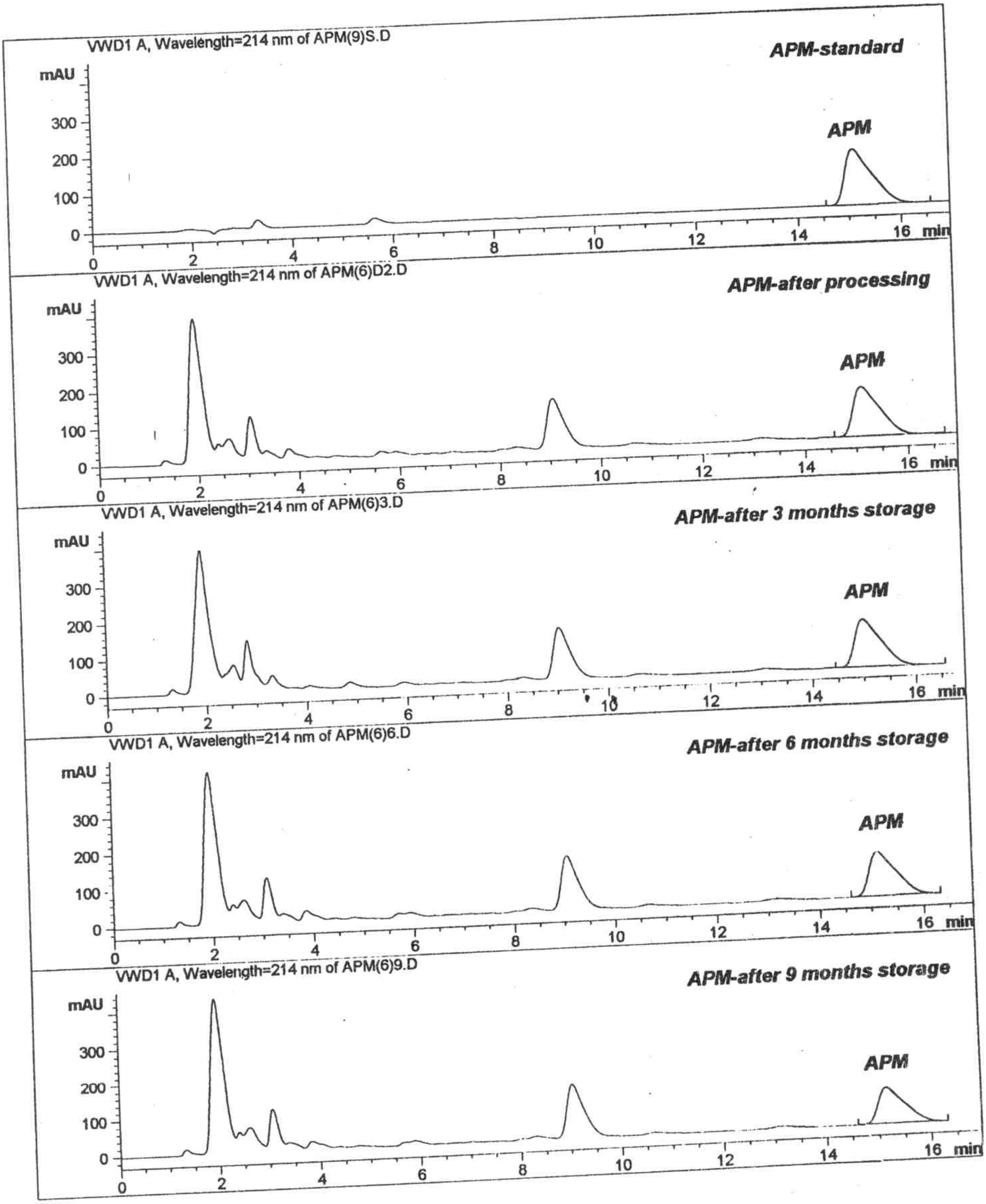
It is noted from Table (13) and figure (3) that in dried apricot sheets sweetened with APM+F mixture, the percentages of APM degradation after processing, 3, 6 and 9 months of storage were 7.5, 12.5, 19.7 and 31.8, respectively.

Table (14): Effect of processing and storage on the degradation of APM in dried apricot sheets sweetened with APM+ACK.

	Standard	Storage period/month			
		Zero	3	6	9
APM %	0.028	0.0249	0.0237	0.021	0.0194
Decrease percentage	--	11.1	15.4	25.0	30.7

Table (15): Effect of processing and storage on the degradation of APM in dried apricot sheets sweetened with APM + St.

	Standard	Storage period/month			
		Zero	3	6	9
APM %	0.028	0.0253	0.0234	0.0199	0.0193
Decrease percentage	--	9.6	16.6	28.9	31.1



(Fig. 3): Chromatograms of standard APM , after processing and during storage on dried apricot sheets sweetened with APM + F.

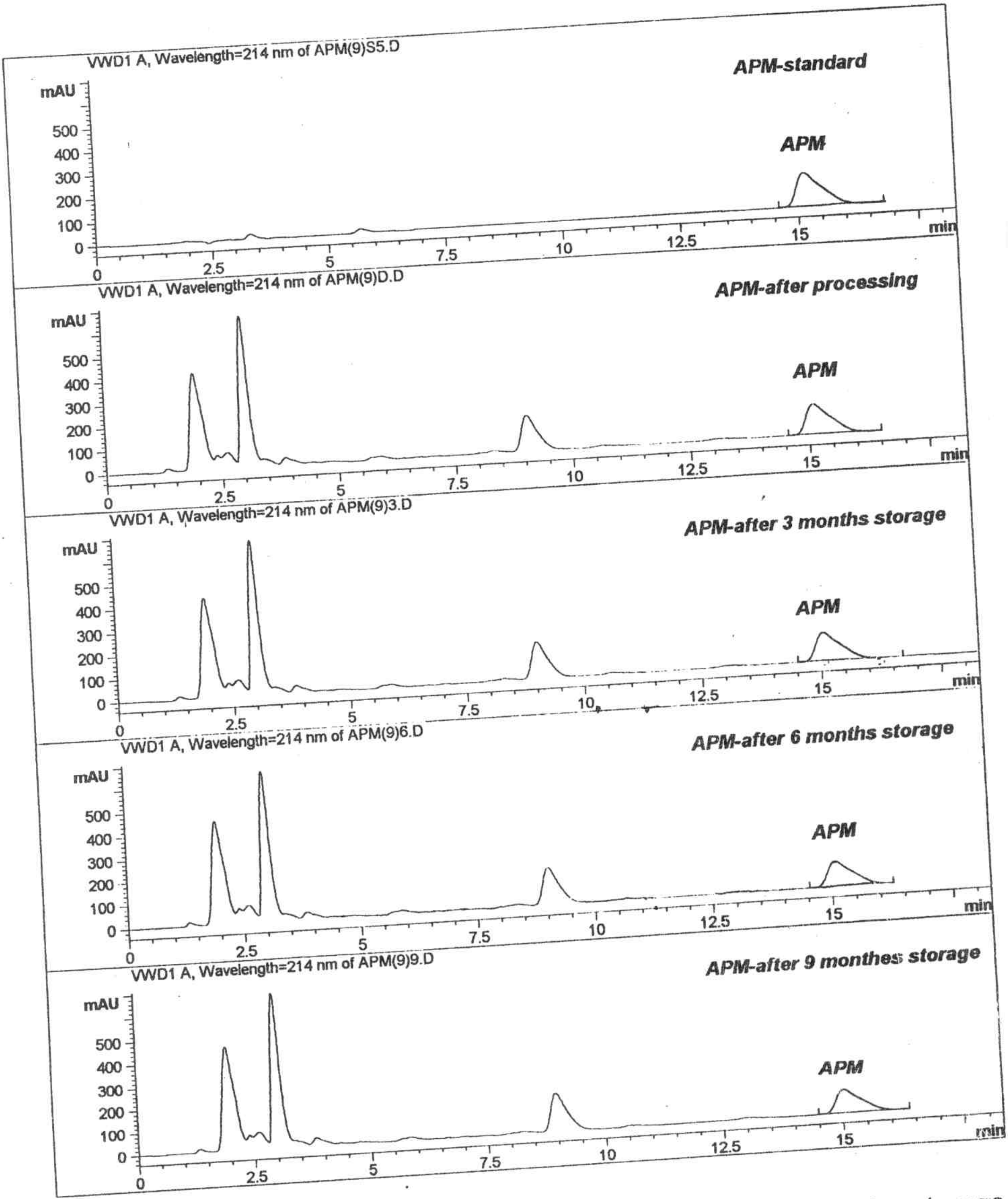
Data presented in Tables (14 and 15) and illustrated in figures (4 and 5) showed that the percentage of APM degradation in dried apricot sheets sweetened with APM + ACK or APM + St, respectively were nearly similar after processing and during storage periods.

From figures (2), (3), (4) and (5) it could be noticed that APM retention time was 15.1 min. in the standard, whereas ranged from 15 to 15.8 min. in samples. Generally, it could be concluded that, APM was decreased gradually after processing and also during storage periods, this decrease may be due to the decomposition of APM by heat and/or storage periods. These results are in agreement with Mazur and Ripper (1980) and Searl & Co. (1980) who stated that the decrease percentage of APM in diet cola and orange juice were 26 and 33.3, respectively, after storage for 6 months.

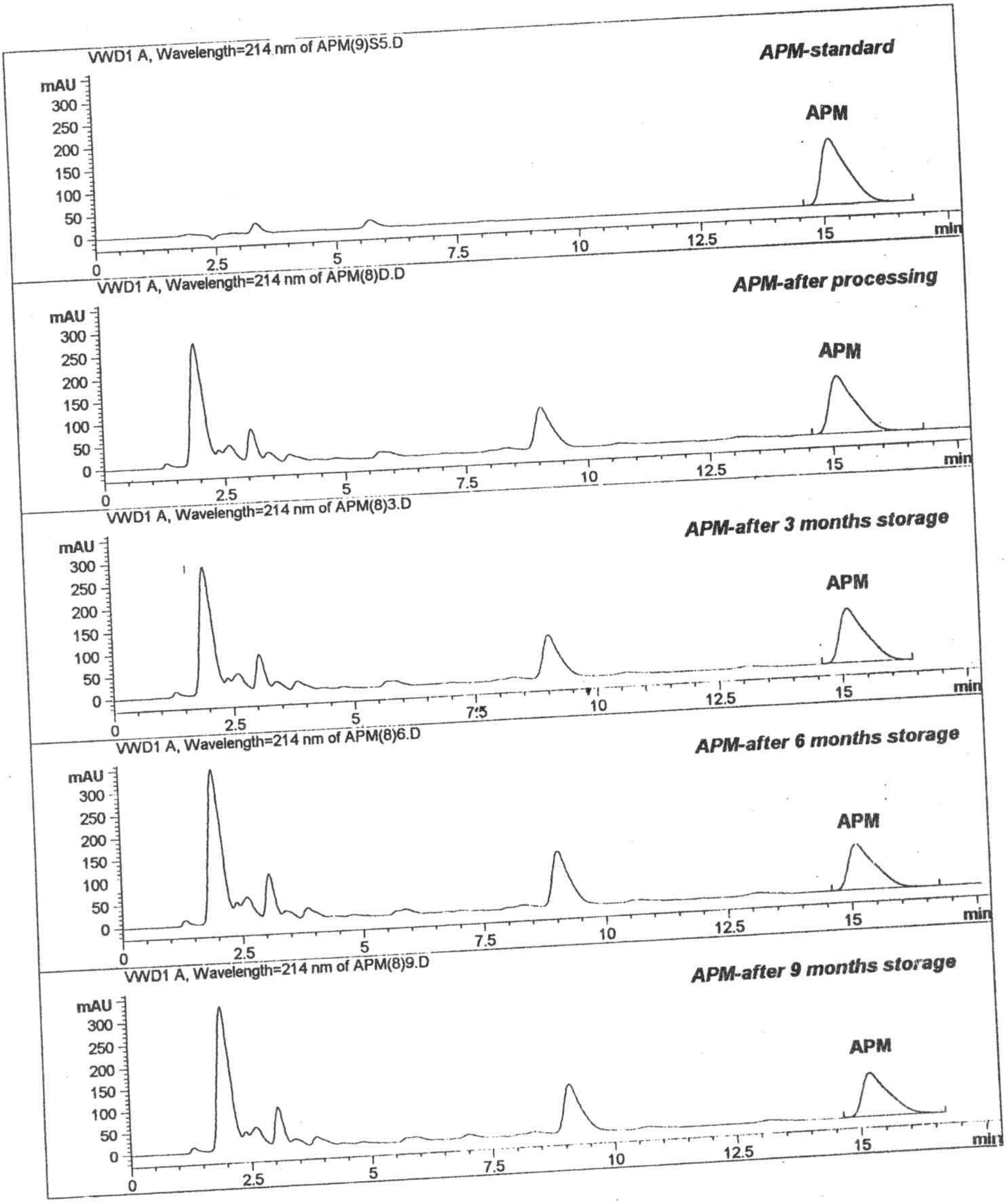
Table (16): Effect of processing and storage on the degradation of ACK in dried apricot sheets sweetened with ACK + F.

	Standard	Storage period/month			
		Zero	3	6	9
ACK %	0.021	0.02095	0.0208	0.0206	0.0205
Decrease percentage	--	0.24	0.95	1.9	2.4

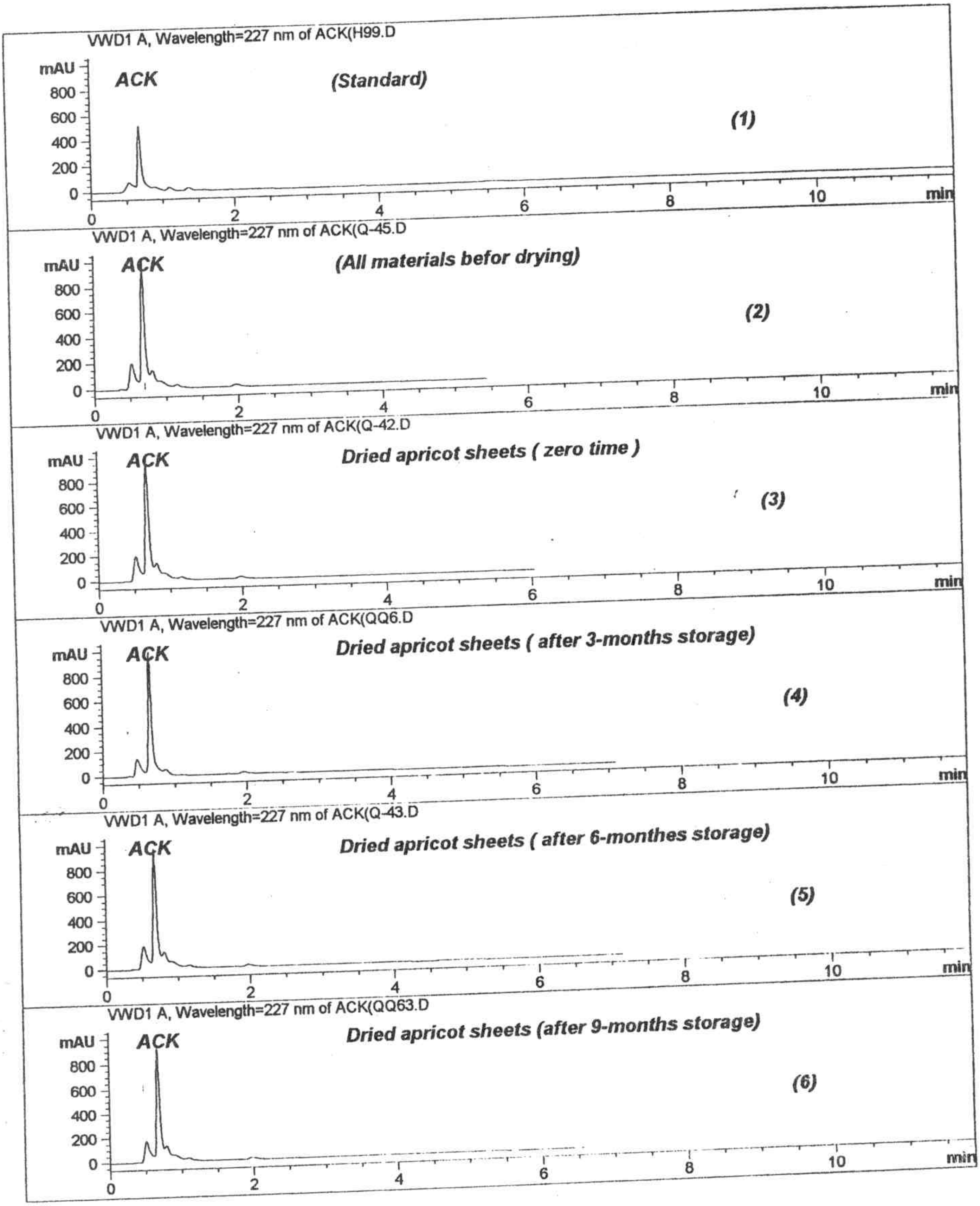
From Table (16) and figure (6) it could be noticed that in dried apricot sheets sweetened with ACK + F there is an interference between ACK and a component of dried apricot sheets and they appear in the same retention time (0.677). In apricot juice with fructose only the Rt was 0.672 whereas in standard for ACK was



(Fig. 4): Chromatograms of standard APM , after processing and during storage on dried apricot sheets sweetened with APM + ACK.



(Fig. 5): Chromatograms of standard APM , after processing and during storage on dried apricot sheets sweetened with APM + St.



(Fig. 6): Chromatograms of standard ACK , all materials before drying , after processing and during storage on dried apricot sheets sweetened with ACK + F.

0.677. From the same figures it could be showed that the decrement of ACK was not distinct after processing and storage. The decrement were 0.95% , 1.9% and 2.4% during storage for 3, 6 and 9 months, respectively. These results are agreement with those reported by Lindley, (1983).

B. *Organoleptic evaluation:*

As in all foods, organoleptic tests are generally the final guide to the quality from the consumers point of view. Significant test was carried out to obtain least significant degree (L.S.D.) between treatments. All Quamar Eldin sheets were organoleptically evaluated for sweetness, color, flavor and appearance.

Data in Table (17) show the average score of evaluation of sweetness for Quamar Eldin sheets. Analysis of variance indicated that there are significant differences between the means of sweetness at zero time and after 9 months storage period for any sweetener, except sucrose, fructose,acesulfame-k + fructose and stevioside + fructose, this difference may be due to degradation of APM during storage.

The same table also indicates that there is no significant difference between means scores of sweetness for sucrose and any other sweetener at zero, whereas there is significant difference between average scores of sweetness for sucrose and any other

Table (17): **Mean values of sweeteness scores for dried apricot sheets during storage.**

Treatments	Storage period (months)				Means
	Zero	3	6	9	
Quamar Eldin sheets sweetened with :					
Sucrose (S)	19.70	19.70	19.50	19.40	19.58
Fructose (F)	19.80	19.70	19.50	19.40	19.60
Aspartame (APM)	18.60	18.00	17.30	16.60	17.63
Aspartame (APM) + Stevioside (St)	19.10	18.70	18.00	17.70	18.38
Aspartame (APM) + Acesulfame - K (ACK)	19.10	18.80	18.40	18.00	18.58
Aspartame (APM) + Fructose (F)	19.20	18.90	18.60	18.20	18.73
Acesulfame-K (ACK) +Fructose (F)	19.40	19.20	19.00	18.90	19.13
Stevioside (St) + Fructose (F)	19.30	19.10	18.90	18.80	19.03

1- L.S.D. (at 0.05 level of significance) between any two means scores of storage period for specific sweetener = 0.55

2- L.S.D. (at 0.05 level of significance) between any two sweeteners within the same storage period = 0.65 .

sweetener except fructose, acesulfame-k + fructose and stevioside + fructose after 3 , 6 and 9 months of storage period.

Data in Table (18) show the average scores of organoleptic evaluation of flavor for Quamar Eldin sheets. Analysis of variance indicated that there is significant difference between the average scores of flavor at zero time and after 9 moths of storage for all treatments.

The same Table indicated that there is no significant difference between means of flavor in all sweeteners after 9 moths of storage.

Data in table (19) show the average scores of color for dried apricot sheets. It could be noticed that there is significant deference between the means of color at zero time and after 9 months for any sweetener, except fructose, acesulfame-K + fructose and stevioside + fructose.

From the same table it could be noticed that there is significant difference between means scores of color for sucrose and any other sweetener at zero time and after 9 months storage period for dried apricot sheets. Also there is significant difference between means scores of color for fructose and any other sweetener after 9 months except acesulfame-k + fructose and stevioside + fructose.

Tabl (18) : **Mean values of flavor scores for dried apricot sheets during storage .**

Treatments	Storage period (months)				Means
	Zero	3	6	9	
Quamar Eldin sheets sweetened with :					
Sucrose (S)	19.40	19.10	18.50	18.10	18.78
Fructose (F)	19.30	19.00	18.40	18.00	18.68
Aspartame (APM)	19.30	19.00	18.40	18.10	18.70
Aspartame (APM) + Stevioside (St)	19.10	18.70	18.00	17.60	18.35
Aspartame (APM) + Acesulfame - K (ACK)	19.20	18.80	18.10	17.70	18.45
Aspartame (APM) + Fructose (F)	19.40	19.00	18.60	18.20	18.80
Acesulfame-K (ACK) + Fructose (F)	19.20	18.80	18.40	17.90	18.58
Stevioside (St) + Fructose (F)	19.10	18.50	18.00	17.50	18.28

1- L.S.D. (at 0.05 level of significance) between any two means scores of storage period for specific sweetener of the same treatment = 0.55

2- L.S.D. (at 0.05 level of significance) between any two sweeteners within the same storage period = 0.65 .

Table (19): **Mean values of color scores for dried apricot sheets during storage .**

Treatments	Storage period (months)				Means
	Zero	3	6	9	
Quamar Eldin sheets sweetened with :					
Sucrose (S)	17.50	16.50	15.60	14.90	16.13
Fructose (F)	19.80	19.50	19.30	19.20	19.45
Aspartame (APM)	18.40	18.00	17.70	17.30	17.85
Aspartame (APM) + Stevioside (St)	18.80	18.50	18.10	17.80	18.30
Aspartame (APM) + Acesulfame - K (ACK)	18.70	18.40	18.00	17.70	18.20
Aspartame (APM) + Fructose (F)	18.60	18.30	18.10	17.90	18.23
Acesulfame-K (ACK) + Fructose (F)	19.20	19.00	18.80	18.70	18.93
Stevioside (St) + Fructose (F)	19.40	19.20	18.90	18.80	19.08

1- L.S.D. (at 0.05 level of significance) between any two means scores of storage period for specific sweetener of the same treatment = 0.55

2- L.S.D. (at 0.05 level of significance) between any two sweeteners within the same storage period = 0.65 .

From Table (20) it could be noticed that there is a significant difference between the means of appearance at zero time and after 9 months storage period for any sweetener in dried apricot sheets.

The same table also indicated that there is significant difference between the means scores of appearance for fructose and any other sweetener at zero time.

C. *Microbiological examination:*

Sulfur dioxide at the concentration of 0.02-0.1% prevents spoilage more than a year when added to fruit juices, (Cruess, 1948).

Data in Table (21) showed that all dried apricot sheets treatments were free from mold and yeast determined as colony forming per one gram (CFU/g.). On the other hand total plate count for Quamar Eldin sheets products were less than 30 CFU/g. or free from colonies after processing and during storage period. This may be due to the effect of heat, acidity, pH, dehydration and sulfur dioxide addition.

Table (20): **Mean values of appearance scores for dried apricot sheets during storage.**

Treatments	Storage period (months)				Means
	Zero	3	6	9	
Quamar Eldin sheets sweetened with : Sucrose (S)	38.80	38.40	38.00	37.60	38.20
Fructose (F)	39.80	39.20	38.70	38.30	39.00
Aspartame (APM)	39.10	39.10	38.60	38.20	38.75
Aspartame (APM) + Stevioside (St)	39.00	38.60	38.00	37.40	38.25
Aspartame (APM) + Acesulfame - K (ACK)	39.00	38.70	38.10	37.60	38.35
Aspartame (APM) + Fructose (F)	39.10	39.10	38.70	38.10	38.75
Acesulfame-K (ACK) + Fructose (F)	39.10	38.80	38.50	38.10	38.63
Stevioside (St) + Fructose (F)	39.10	38.80	38.40	38.00	38.58

1- L.S.D. (at 0.05 level of significance) between any two means scores of storage period for specific sweetenerof the same treatment = 0.55

2- L.S.D. (at 0.05 level of significance) between any two sweeteners within the same storage period = 0.65 .

Table (21) : Total microbial counts (CFU/g) of dried apricot sheets during storage.

Treatments	Storage period (months)							
	Zero		3		6		9	-
	Mold & Yeast	Total count	Mold & Yeast	Total count	Mold & Yeast	Total count	Mold & Yeast	Total count
S	0	0	0	0	0	< 30	0	< 30
F	0	0	0	0	0	< 30	0	< 30
APM	0	0	0	< 30	0	< 30	0	< 30
APM + ST	0	0	0	< 30	0	< 30	0	< 30
APM + ACK	0	0	0	< 30	0	< 30	0	< 30
APM + F	0	0	0	0	0	< 30	0	< 30
ACK + F	0	0	0	0	0	< 30	0	< 30
ST + F	0	0	0	0	0	< 30	0	< 30

CFU/g = Colony forming per one gram.

S : Sucrose

F : Fructose

APM : Aspartame

ACK : acesulfame - K

St : stevioside

II- Halwa tahinia :

A. *Chemical properties:*

Sesame tahina is the principal ingredient in "halwa tahinia" and the main components were fat and protein which reached to 53.85 and 23.7% respectively. Whereas tahina partially defatted contains 40.35% fat and 30.6% protein, this result agree with that stated by Osman et al., (1991) and El-Bardeny (1993) for sesame tahina. Whole sesame tahina and tahina partially defatted also contain 1.6 & 2.0% moisture, 3.12 & 4.0% ash, 3.7 & 4.85% fiber and 13.95 & 18.2 % available carbohydrate, respectively (Table 22). The oil of both tahina had 0.505 & 0.5% free fatty acids and 3.5 & 3.46 peroxide value (m.eq./Kg. oil), respectively.

To reduce calorie we must use partially defatted tahina by separation sesame oil from the macerate (crude ground sesame seeds). The total energy was reduced from 635.33 K. calorie /100 g. in whole sesame tahina to 558.35 K. calorie in partially defatted tahina.

Moisture content was low in the products, this is due to the "halwa tahinia" fatty nature. It could be noticed from Table (23) that there was a fluctuated trend in moisture content in different "halwa tahinia" samples processed by different treatments. These results agree with those obtained by El-Dokany (1965) and Ilany-Feigenbaum (1965). From the same table it could be stated that thhygrof polydextrose and fructose may cause little

Table (22). Chemical analysis and energy of both whole sesame tahina and defatted tahina.

Analysis	Whole sesame tahina	Tahina partially defatted
Moisture	1.60	2.00
Fat	53.85	40.35
Protein	23.70	30.60
Ash	3.12	4.00
Fiber	3.76	4.85
Available carbohydrate	13.97	18.20
Energy (Kcal./100 g.)	635.33	558.35
Peroxide value (m. eq./K. oil)	3.50	3.46
Free fatty acids (% oleic)	0.505	0.500

Table (23): Moisture content percentage of different halwa tahinia diets.

Treatments	Sesame halwa tahinia samples	
	Whole fat	Partially defated
Halwa tahinia prepared with :		
Sucrose (S)	2.1	3.1
Fructose (F)	2.7	3.0
Aspartame (APM)	2.9	3.0
Aspartame (APM) + Stevioside (St)	2.8	2.9
Aspartame (APM) + Acesulfame - K (ACK)	2.7	3.0
Aspartame (APM) + Fructose (F)	3.3	3.5
Acesulfame-K (ACK) + Fructose (F)	3.5	3.7
Stevioside (St) + Fructose (F)	3.0	3.6

difference in moisture content, whereas moisture content in different halwa ranged from 2.1 to 3.0% in whole sesame tahina and ranged from 2.9 to 3.7% tahina partially defatted, The Egyptian Standard No. 384, 992, 1332 (1989) stated that the moisture should not more than 5%.

Results from Table (24) indicate that the trend of the results showed no special pattern. Fat content in "halwa tahinia" made from whole tahina ranged from 26.0 to 26.5% and from tahina partially defatted from 19.1 to 19.7%, the Egyptian Standard No. 384, 992, 1332 (1989) mentioned that the fat in natural "halwa tahinia" should not less than 24%.

Data in Table (25) showed that the percentage of total protein in different treatments of halwa tahinia partially defatted was higher than that in whole sesame tahina, it ranged from 14.8 to 15.4% whereas, no change in the protein percentage in different treatments for whole tahina, it ranged from 11.1 to 11.8%. These results are in agreement with El-Dokany (1965) and Baylan et al., (1993).

The total reducing sugars of tahina partially defatted treatments is slightly high than those treatments of whole tahina, this slight increase is not real but due to the reduced fat from whole tahina (Table 26). It could be also noticed that sucrose treatment was higher in total reducing sugars than any other treatment, 53.2%. It is due to substitution of sucrose with fructose and the sweeteners.

Table (24): Fats content percentage of different halwa tahinia diets.

Treatments	Sesame halwa tahinia samples	
	Whole fat	Partially defated
Halwa tahinia prepared with :		
Sucrose (S)	26.5	19.4
Fructose (F)	26.2	19.5
Aspartame (APM)	26.0	19.7
Aspartame (APM) + Stevioside (St)	26.2	19.6
Aspartame (APM) + Acesulfame - K (ACK)	26.4	19.7
Aspartame (APM) + Fructose (F)	26.0	19.5
Acesulfame-K (ACK) + Fructose (F)	26.3	19.1
Stevioside (St) + Fructose (F)	26.5	19.8

Table (25): Protein content percentage of different halwa tahinia diets.

Treatments	Sesame halwa tahinia samples	
	Whole fat	Partially defatted
Halwa tahinia prepared with :		
Sucrose (S)	11.7	15.1
Fructose (F)	11.6	15.4
Aspartame (APM)	11.5	14.9
Aspartame (APM) + Stevioside (St)	11.6	15.0
Aspartame (APM) + Acesulfame - K (ACK)	11.7	14.9
Aspartame (APM) + Fructose (F)	11.5	14.8
Acesulfame-K (ACK) + Fructose (F)	11.1	15.1
Stevioside (St) + Fructose (F)	11.8	15.0

Table (26): Total reducing sugars content percentage of different halwa tahinia diets.

Treatments	Sesame halwa tahinia samples	
	Whole fat	Partially defatted
Halwa tahinia prepared with :		
Sucrose (S)	53.2	56.1
Fructose (F)	39.2	40.1
Aspartame (APM)	6.5	8.5
Aspartame (APM) + Stevioside (St)	6.7	8.7
Aspartame (APM) + Acesulfame - K (ACK)	6.5	8.7
Aspartame (APM) + Fructose (F)	22.2	24.0
Acesulfame-K (ACK) + Fructose (F)	22.0	24.4
Stevioside (St) + Fructose (F)	21.8	24.7

whereas the samples sweetened with artificial sweeteners had the lowest content of total reducing sugar. Total reducing sugars were 6.5. 6.7, and 6.5% for treatments sweetened with APM, APM + stevioside and APM + acesulfame-K, respectively. While the "halwa tahinia" sweetened with fructose only had total reducing sugar less than treatment with sucrose 39.2%. Also the treatments sweetened with mixture of fructose and artificial sweeteners had total reducing sugars more than artificial sweetener only and less than treatments sweetened with fructose only. These results are in agreement with those obtained by Ilany-Feigenbaum (1965) and Hashem et al., (1991), who mentioned that normal "halwa tahinia" had a total reducing sugar 53.4 and 50.8-59.2% respectively, and also the Egyptian Standard No. 384, 992, 1332 (1989) mentioned that the total reducing sugars should not less than 40% in normal "halwa tahinia" .

The total calories per 100 gm of Halwa from whole tahina is different according to the sweetener type which is higher in sucrose and fructose treatments and lower in artificial sweetener treatments, the data from Table (27) showed that sucrose treatment has 498.1 calories per 100 g. whereas is 306, 309 and 310.4 in APM, APM+stevioside and APM+acesulfame-K treatments respectively.

Data from Table (28) show the ash content of halwa tahinia. No special pattern for ash in different treatments and a fluctuated trend in ash was also observed in different treatments. These results agree

Table (27): Caloric content per 100 g. of different halwa tahinia diets.

Treatments	Sesame halwa tahinia samples	
	Whole fat	Partially defatted
Halwa tahinia prepared with :		
Sucrose (S)	498.1	459.4
Fructose (F)	439.0	360.6
Aspartame (APM)	306.0	270.9
Aspartame (APM) + Stevioside (St)	309.0	271.2
Aspartame (APM) + Acesulfame - K (ACK)	310.4	271.7
Aspartame (APM) + Fructose (F)	368.8	330.7
Acesulfame-K (ACK) + Fructose (F)	369.1	329.9
Stevioside (St) + Fructose (F)	372.9	337.0

Table (28): Total ash content percentage of different halwa tahinia diets.

Treatments	Sesame halwa tahinia samples	
	Whole fat	Partially defatted
Halwa tahinia prepared with :		
Sucrose (S)	1.58	2.05
Fructose (F)	1.43	1.92
Aspartame (APM)	1.82	2.16
Aspartame (APM) + Stevioside (St)	1.75	2.15
Aspartame (APM) + Acesulfame - K (ACK)	1.75	2.21
Aspartame (APM) + Fructose (F)	1.53	2.05
Acesulfame-K (ACK) + Fructose (F)	1.56	2.13
Stevioside (St) + Fructose (F)	1.62	2.24

with those obtained by El-Dokany (1965) and Baylan et al., (1993) who mentioned that normal "halwa tahinia" had 1.41-2.11 and 1.33-1.91% total ash respectively. The Egyptian Standard No. 384, 992 and 1332 (1989) mentioned that the total ash should not exceed 2.0% for normal "halwa tahinia".

From Table (29) it could be noticed that the zinc, copper, arsenic and lead in all treatments, were less than the limits allowed by the Egyptian Standard No.384, 992, 1332 (1989) which stated that the zinc, copper, arsenic and lead should not exceed 150, 10, 0.5 and 0.5 p.p.m., respectively for normal "halwa tahinia".

The primary products of lipid oxidation are hydroperoxides which are generally referred to peroxides. Therefore, it seems reasonable to determine the concentration of peroxides as a measure of the extent of oxidation. However, this theory is limited due to the transitory nature of the peroxides which are intermediate products in the formation of carbonyl and hydroxyl compounds. Data in Table (30) showed that the peroxide value (m.eq./Kg oil) ranged from 7.3 to 8.2 and 6.5 to 7.6 for unstored "halwa tahinia" made from whole sesame tahina and sesame tahina partially defatted, respectively. As revealed from Table (30) it was found that the oil was separated from whole sesame halwa after two months of storage in all treatments, the separated amount of oil increased as storage time increased, meanwhile the oil separation appeared in the halwa partial defatted after three months of storage.

Table (29) : The mineral content of different halwa tahinia diets (calculated as mg/100 g).

Treatments	Minerals							
	Zn		Cu		As		Pb	
	(a) *	(b) **	(a) *	(b) **	(a) *	(b) **	(a) *	(b) **
S	12.17	13.83	0.81	0.94	0.036	0.043	0.036	0.052
F + P.D.	11.63	11.95	0.72	0.86	0.022	0.031	0.021	0.026
APM + P.D.	10.37	12.03	0.57	0.69	0.016	0.017	0.008	0.013
APM + ST + P.D.	10.04	12.02	0.56	0.68	0.015	0.021	0.007	0.009
APM + ACK + P.D.	10.22	11.81	0.58	0.71	0.008	0.013	0.006	0.012
APM + F + P.D.	11.13	11.80	0.63	0.75	0.015	0.021	0.013	0.017
ACK + F + P.D.	10.65	11.25	0.61	0.70	0.013	0.020	0.012	0.013
ST + F + P.D.	11.18	12.12	0.65	0.72	0.017	0.019	0.015	0.019

S : Sucrose
F : Fructose
APM : Aspartame

ACK : acesulfame - K
St : stevoiside
P.D. : Polydextrose

* (a) : Whole sesame tahina
** (b) : Sesame tahina partial defatted

Table (30): Effect of storage for 6 months at 5 °C on peroxide value (m. eq./kg oil) and oil separation of different halwa diets.

Storage period (months)	Treatments															
	Made with whole sesame tahina								Made with defatted sesame tahina							
	S	F + P.D.	APM + P.D.	APM+St + P.D.	APM+ACK + P.D.	APM+F + P.D.	ACK+F + P.D.	St + F + P.D.	S	F + P.D.	APM + P.D.	APM+St + P.D.	APM+ACK + P.D.	APM+F + P.D.	ACK+F + P.D.	St + F + P.D.
Zero	8.2 (-)	7.8 (-)	7.3 (-)	7.4 (-)	7.6 (-)	8.0. (-)	7.9 (-)	7.7 (-)	7.6 (-)	7.2 (-)	7.0 (-)	6.8 (-)	6.5 (-)	6.9 (-)	7.0 (-)	7.1 (-)
1	8.3 (-)	8.1 (-)	7.5 (-)	7.8 (-)	7.9 (-)	8.3 (-)	8.0 (-)	8.1 (-)	7.8 (-)	7.5 (-)	7.3 (-)	7.0 (-)	6.6 (-)	7.1 (-)	7.2 (-)	7.5 (-)
2	8.5 (-)	8.4 (-)	8.0 (-)	8.4 (-)	8.1 (-)	8.5 (-)	8.2 (-)	8.3 (-)	7.9 (-)	7.8 (-)	7.5 (-)	7.3 (-)	6.7 (-)	7.3 (-)	7.5 (-)	7.7 (-)
3	8.9 (+)	8.8 (+)	8.3 (+)	8.5 (+)	8.3 (+)	8.8 (+)	8.6 (+)	8.4 (+)	8.2 (-)	8.0 (-)	7.9 (-)	7.7 (-)	6.9 (-)	7.6 (-)	7.8 (-)	7.8 (-)
4	9.4 (+)	9.0 (+)	8.7 (+)	8.8 (+)	8.7 (+)	9.2 (+)	9.0 (+)	8.6 (+)	8.5 (+)	8.2 (+)	8.2 (+)	8.0 (+)	7.3 (+)	7.7 (+)	7.9 (+)	8.0 (+)
5	9.8 (+)	9.1 (+)	8.8 (+)	9.2 (+)	9.1 (+)	9.7 (+)	9.4 (+)	9.2 (+)	8.6 (+)	8.5 (+)	8.3 (+)	8.3 (+)	7.7 (+)	7.9 (+)	8.2 (+)	8.3 (+)
6	10.0 (+)	9.7 (+)	9.4 (+)	10.1 (+)	9.8 (+)	10.0 (+)	9.6 (+)	9.8 (+)	9.0 (+)	8.6 (+)	8.4 (+)	8.5 (+)	8.1 (+)	8.3 (+)	8.6 (+)	8.8 (+)

S : Sucrose
F : Fructose
APM: Aspartame

ACK : acesulfame- K
St : stevioside
P.D. : polydextrose

(-) No oil separation occurred
(+) Oil separation occurred

The free fatty acids % of the halwa tahinia was used as a measure of the effect of both oxidation and hydrolysis during free fatty acids formation. Data in Table (31) show the free fatty acids (as % oleic) in different treatments of whole sesame tahina and tahina partially defatted. It ranged from 0.553 to 0.59% and 0.567 to 0.602% for unstored halwa tahinia, respectively. A slight increase was observed in the free fatty acids during storage, this may be due to oxidation and hydrolysis which produce free fatty acids.

From figure (7) it could be noticed that APM percentage in "halwa tahinia" sweetened with APM was decreased after processing. It could be observed that the percentage of APM as a standard was 0.33 and after processing decreased to 0.286% . It could be concluded that the percentage of APM degradation after processing was 13.3. These results are in agreement with those stated by Searl & Co., (1980).

Figure (8) shows chromatograms of ACK standard which appeared in the same retention time of a component of "halwa tahinia", with fructose only (Rt 0.77 min). To solve the interference problem, inject samples containing all materials of "halwa tahinia" before and after processing. It could be observed that the percentage of ACK before processing was 0.125 and after processing decreased to 0.124, it means that the percentage of ACK degradation after processing was 0.8. These results agree with those reported by Lindley, (1983) who stated that acesulfame-K (in aqueous solutions) may be sterilized at pH 4 and 120°C with detectable decomposition.

Table (31): Effect of storage for 6 months at 5 °C on free fatty acids (% oleic) in different halwa diets.

Storage period (months)	Treatments															
	Made with whole sesame tahina								Made with defatted sesame tahina							
	S	F + P.D.	APM + P.D.	APM+St + P.D.	APM+ACK + P.D.	APM+F + P.D.	ACK+F + P.D.	St + F + P.D.	S	F + P.D.	APM + P.D.	APM+St + P.D.	APM+ACK + P.D.	APM+F + P.D.	ACK+F + P.D.	St + F + P.D.
Zero	0.563	0.553	0.585	0.591	0.579	0.585	0.578	0.590.	0.557	0.567	0.577	0.571	0.580.	0.585	0.588	0.602
3	0.611	0.665	0.678	0.703	0.685	0.716	0.710.	0.695	0.601	0.632	0.653	0.647	0.653	0.671	0.685	0.708
6	0.751	0.786	0.789	0.836	0.808	0.865	0.855	0.880.	0.718	0.739	0.773	0.797	0.801	0.835	0.847	0.866

S : Sucrose

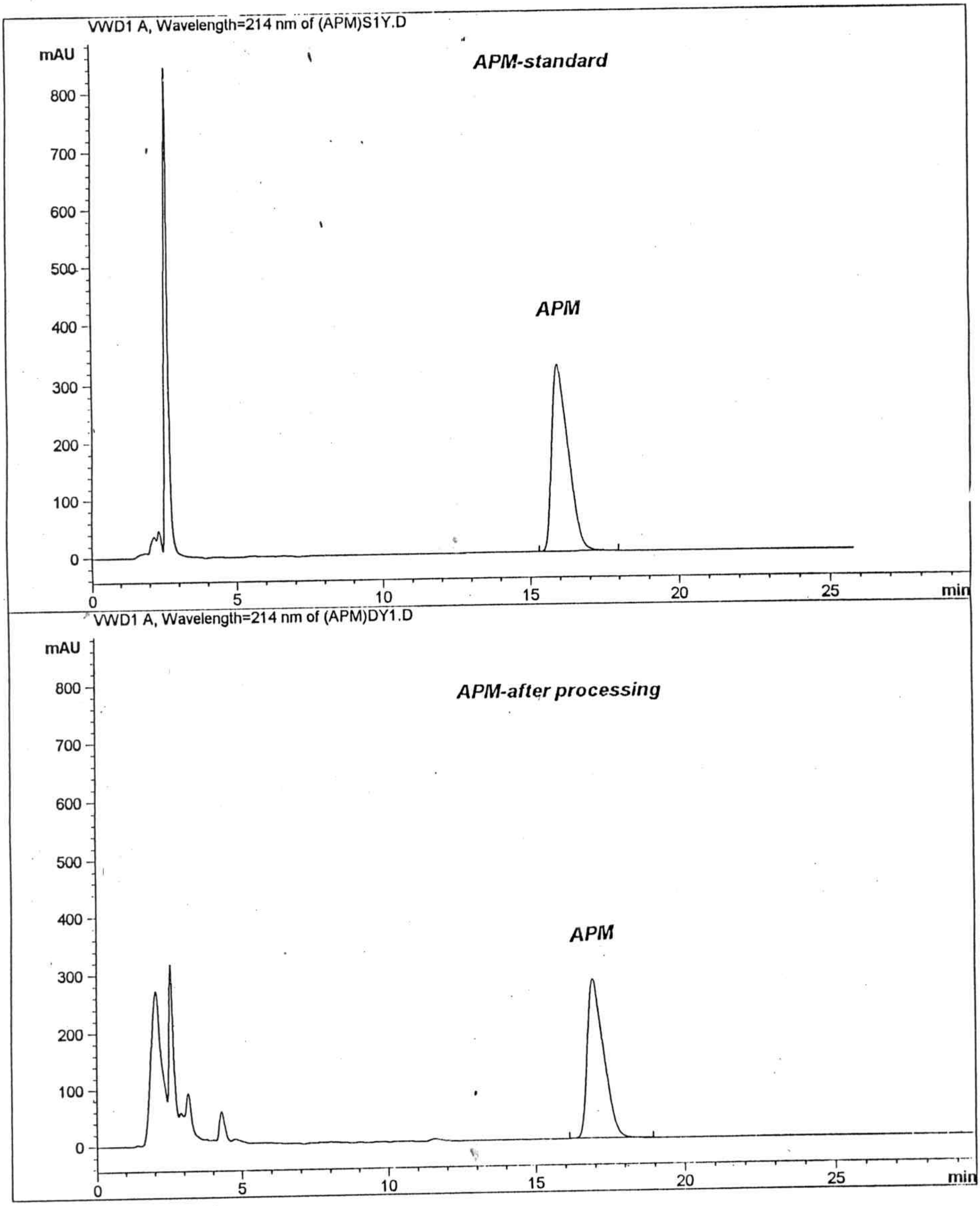
F : Fructose

APM: Aspartame

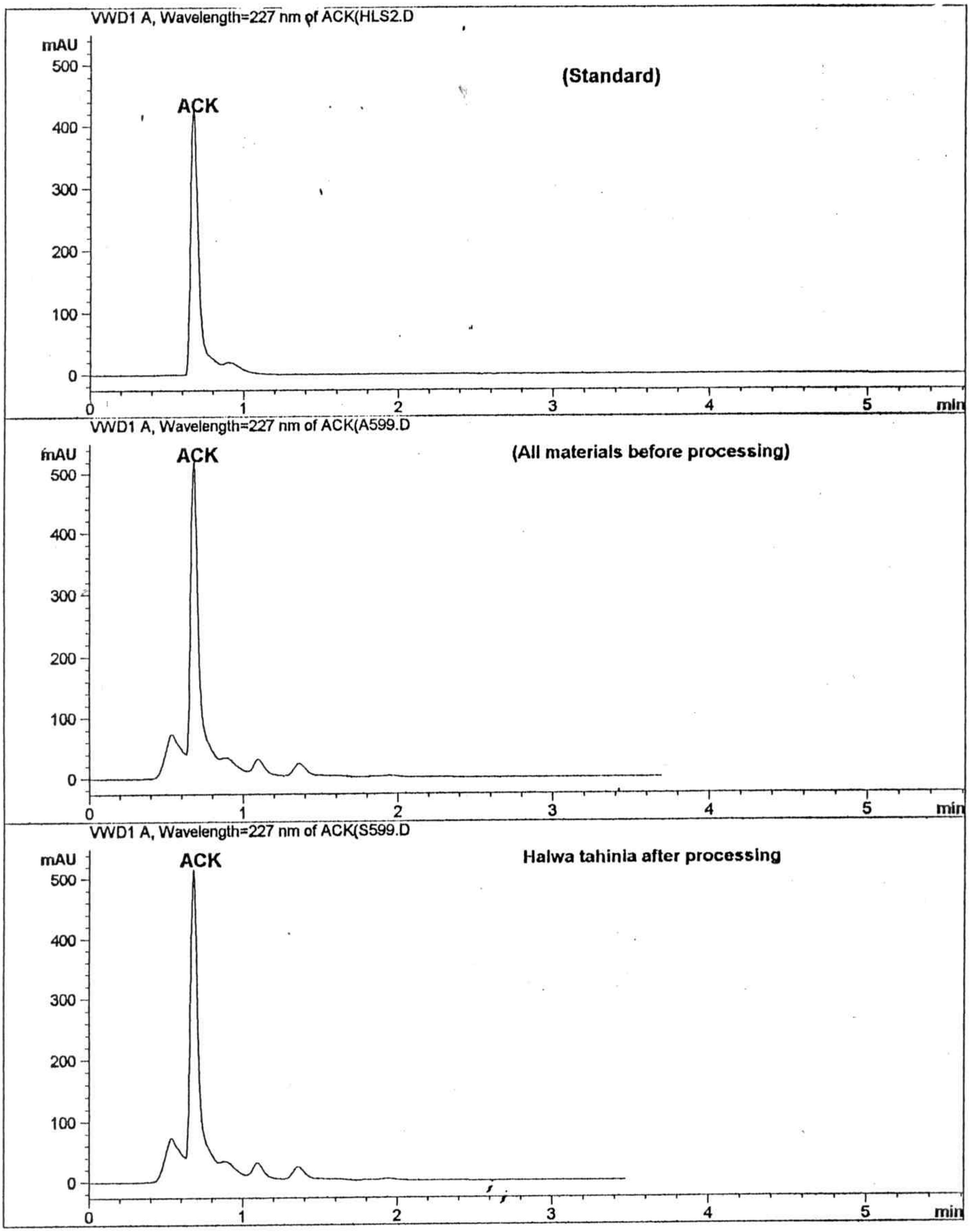
ACK : acesulfame- K

St : stevioside

P.D. : polydextrose



(Fig. 7): Chromatograms of standard APM and after processing on halwa tahinia sweetened with APM .



(Fig. 8): Chromatograms of standard ACK , all materials before processing and after processing on halwa tahinia sweetened with ACK + F.

B- Organoleptic evaluation:

The average scores of organoleptic evaluation of sweetness for "halwa tahinia" are shown in Table (32). It could be noted that there is significant difference between mean scores of sweetness for sucrose or fructose and any other sweetener within both halwa from whole sesame tahina or partially defatted tahina.

Data also showed that there is no significant difference between any two sweetness averages of whole sesame tahina within and partially defatted tahina for the same sweetener.

Data in Table (33) show the average scores of appearance for "halwa tahinia" diet. Analysis of variance indicated that there is significant difference between mean scores of appearance for sucrose or fructose and any other sweetener within both whole sesame tahina or partially defatted tahina.

On the other hand comparing between any two means of appearance of whole sesame tahina and tahina partially defatted for the same sweetener indicated that the difference were not significant.

The average scores of organoleptic evaluation of texture for "halwa tahinia" are shown in Table (34). It could be seen that there is no significant difference between mean scores of texture for sucrose and fructose within both halwa from whole sesame tahina or partially defatted tahina, while between sucrose or fructose and any other sweetener these differences are significant.

Table (32) : Mean values of sweetness scores for different halwa tahinia diet.

Treatments	Whole sesame tahina	Partially defatted sesame tahina	Means
Halwa tahinia prepared with:			
S	19.30	19.00	19.15
F + P.D.	19.40	19.20	19.35
APM + P.D.	17.50	17.60	17.55
APM + ST + P.D.	18.30	18.20	18.25
APM + ACK + P.D.	18.50	18.40	18.45
APM + F + P.D.	18.90	18.70	18.80
ACK + F + P.D.	19.00	19.10	19.05
ST + F + P.D.	18.70	18.50	18.60

1- L.S.D. (at 0.05 level of significance) between any two sweetners within specific kind of halwa = 0.2115

2- L.S.D. (at 0.05 level of significance) between two average of whole fat and partially defatted for the same sweetner = 0.88

S : Sucrose
F : fructose
APM : aspartame

ACK : acesulfame-K
St : stevioside.
P.D. : polydextrose

Table (33) : Mean values scores of appearance for different halwa tahinia diet.

Treatments	Whole seasame tahina	Partially defatted seasame tahina	Means
Halwa tahinia prepared with:			
S	39.80.	39.70	39.85
F + P.D.	39.70	39.60	39.65
APM + P.D.	37.40	37.00	37.20
APM + ST + P.D.	38.30	38.00	38.15
APM + ACK + P.D.	38.20	38.10	38.15
APM + F + P.D.	38.90	38.80	38.85
ACK + F + P.D.	39.10	39.00	39.05
ST + F + P.D.	39.00	38.90	38.95

1- L.S.D. (at 0.05 level of significance) between any two sweetners within specific kind of halwa = 0.306

1- L.S.D. (at 0.05 level of significance) between two average of whole fat and partially defatted for the same sweetner = 0.856

S : Sucrose
F : fructose
APM : aspartame

ACK : acesulfame-K
St : stevioside.
P.D. : polydextrose

Table (34) : Mean values scores of texture for different halwa tahinia diet.

Treatments	Whole sesame tahina	Partially defated sesame tahina	Means
Halwa tahinia prepared with:			
S	19.70	19.40	19.55
F + P.D.	19.60	19.50	19.55
APM + P.D.	18.20	18.00	18.10
APM + ST + P.D.	18.10	18.00	18.05
APM + ACK + P.D.	18.00	18.20	18.10
APM + F + P.D.	18.90	18.80	18.85
ACK + F + P.D.	18.90	18.70	18.80
ST + F + P.D.	19.00	18.90	18.95

1- L.S.D. (at 0.05 level of significance) between any two sweetners within specific kind of halwa = 0.308

2 - L.S.D. (at 0.05 level of significant) between two average of whale fat and partially defatted for the same sweetner = 1.029

S : Sucrose
F : fructose
APM : aspartame

ACK : acesulfame-K
St : stevoside.
P.D. : polydextrose

It is also indicated that there is no significant difference between any two sweetness average scores of whole sesame tahina and partially defatted tahina within the same sweetener.

The average scores of color for "halwa tahinia" is shown in Table (35). It could be noticed that there is no significant difference between fructose and any other sweetener except sucrose, APM+P.D., APM+St+P.D. and APM+Ack+P.D. within both halwa from whole sesame tahina or partially defatted tahina.

Data also show that there is no significant difference between any two caof whosesame and partial defatted for the same sweetener.

Table (35) : Mean values scores of color for different halwa tahinia diet.

Treatments	Whole sesame tahina	Partially defatted sesame tahina	Means
Halwa tahinia prepared with:			
S	19.0	19.2	19.10
F + P.D.	19.6	19.5	19.55
APM + P.D.	19.2	19.1	19.20
APM + ST + P.D.	19.2	19.2	19.25
APM + ACK + P.D.	19.3	19.0	19.15
APM + F + P.D.	19.4	19.5	19.45
ACK + F + P.D.	19.5	19.5	19.50
ST + F + P.D.	19.6	19.5	19.55

1- L.S.D. (at 0.05 level significance) between any two sweetners within specific kind of halwa = 0.294

2- L.S.D. (at 0.05 level of significance) between two average of whale fat and partially defatted for the same sweetner = 0.498

S : Sucrose
F : fructose
APM : aspartame

ACK : acesulfame-K
St : stevioside.
P.D. : polydextrose

SUMMARY

This study was carried out mainly to formulate some diabetic diets such as dried apricot sheets "Quamar Eldin" and "halwa tahinia", to follow the changes in their quality and composition during processing and storage .

Dietetic foods suitable for diabetics may have the same "calorie - value" but are used as a sugar substitute, which is intended to replace sucrose or glucose. Fructose and non-nutritive sweeteners are often allowed for diabetics, since their metabolism does not require insulin.

This investigation was carried out to determine whether non-nutritive sweeteners (aspartame, acesulfame-K, and stevioside or mixtures of them) and /or fructose could be used to replace sweetness of sucrose in "Quamar Eldin" sheets and "halwa tahinia" diet.

A- "Quamar Eldin" sheets :-

- "Quamar Eldin" sheets of different treatments were prepared by sun drying and the chemical analysis of different treatments of "Quamar Eldin" sheets after processing and during storage for nine months at 5°C were carried out :

a- The percentage of total sugars varied widely in different treatments and decreased during storage. This may be due to the reaction between amino acids and sugars.

b- The percentage of reducing sugars for the sample sweetened with fructose was higher than other treatments and increased during storage .

c- The total acidity for all "Quamar Eldin" treatments were nearly similar and decreased during storage.

d- The carotenoids responsible for the orange color decreased markedly during processing and storage. The brown color developed due to the none - enzymatic browning reaction. The formation of the brown color was accompanied by a decrease in ascorbic acid, amino acids and sugars.

e- The color was darker in "Quagmire Eldin" sheets sweetened with sucrose than the other treatments, whereas sample sweetened with fructose was bright.

f- The (CFU/g)for mold and yeast was less than 10 for all "Quamar Eldin" treatments during storage, whereas the (CFU/g) for total bacteria count less than 30 for all treatments after storage period.

B- "<u>Halwa Tahinia</u>" :-

* Two types of "halwa tahinia" were prepared. Whole sesame tahina was used in the first type and partially defatted sesame tahina was used in the second type.

a- The chemical analysis and energy of both sesame tahina and tahina partially defatted were determined.

b- The moisture content of halwa tahinia made from partially defatted tahina was higher than that from whole sesame tahina.

c- Fat content in "halwa tahinia" made from whole tahina ranged from 26.0 to 26.5% and from tahina partially defatted ranged from 19.1 to 19.7%.

d- The total sugars of partially defatted tahina were slightly higher than those of whole tahina.

e- The total calories per 100 g. of halwa tahinia were different according to the sweetener type.

f- Peroxide value (m.eq./Kg oil) in "halwa tahinia" made from whole sesame tahina was higher than those of partially defatted tahina.

g- Oil was separated from whole sesame halwa treatments after two months of storage, meanwhile the oil separation appeared in the halwa partially defatted after three months of storage.

** High performance liquid chromatography was used to determine the APM and ACK in both "Quamar Eldin" sheets and "halwa tahinia" treatments.

** Organoleptic evaluation was used to test consumer preference in respect to the effect of different processing techniques and storage period on quality attributes of all "Quamar Eldin" treatments and "halwa tahinia" diets.

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