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EVALUATION OF SOME VEGETABLES BUTTER FAT FROM LOCAL MARKET .

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ABSTRACT

Physico chemical properties of some local vegetable butter fats were studied to evaluate their quality and nutritive value. Results showed that, refractive index (R.I) had a slight differences between the tested samples. Melting point (M.P.) was higher in sample(2) than others, and this could be attributed to its higher content of saturated fatty acids. The recorded low acid value (A.V.) of all samples indicated the absence of hydrolysis, also , peroxide value (P.V.) was low in all samples except for sample(٣) . Saponification (S.V.) and iodine values (I.V.) were different between samples due to their contents of fatty acids. Results showed a relatively low percentage of unsaponifiable matters and a high content of ester value for the tested samples. Results also showed that Sample(1) has the highest content of glycerol and sample (2) has the highest content of Tocopherols. Samples contain a small amount of trans fatty acids and this may due to the hydrogenation process. Palmatic acid was the major saturated fatty acid, meanwhile, oleic acid was the major unsaturated fatty acid in all the tested samples. The steady increase in peroxide value during oven test revealed the safety of these vegetable fats.

Keywords: vegetable oils, palm oil, melting point, trans fatty acids and hydrogenated.

INTRODUCTION

Fat and oils are considered as the main source of energy for human diet. They provide the human being not only with energy but also with the fat soluble vitamins and the essential fatty acids. They have an improved effect on the texture and eating qualities of other food stuff. [Sarkkinen ,(2003) and Battino ,*et al.*, (2002)] The area of the cultivated oil seed crops in Egypt are insufficient. For this reason Egypt is obligated to import the vegetable oils to cover its needs from this main part of nutrition. Palm oil is one of many kinds of oils that is acceptable to the Egyptian populars . The palm oil is produced from the fruits of oil palm, *Elaeis Guineesis* which is cultivated in the tropical regions. Malaysia is considered now as the principle producer and exporter of crude and manufactured palm oil all over the world.[Man ,*et al.*(1993)]. In Egypt, this oil is treated to be a shortening product. The demand for palm oil increases year after year because of the suspicion towards other imported tallow and hydrogenated oils. Palm oil plays a great role in the manufacture of shortening and margarine without any other oily additives.

Trans fatty acids (T.F.AS), in high levels in the diet have repeatabley been shown to affect serum lipids lipoprotiens unfavorably , with higher intake resulting in higher serum low - density lipoprotein (LDL) cholestrol and lipoprotien and lower serum high - density lipoprotein (HDL) cholesterol concentrations. Thus there are a positive relationship between T.F.A. intake and risk of coronary heart disease . This is attributed to the intake of hydro-

genated vegetable oil. In addition, high intake of T.F.A may have other health consequences [Ovesen, *et al.*, (1998)].

The accumulation of dietary T.F.AS. Are interesting in that chronic feeding which leads to elevation of lipogenic enzyme activity, although this enzyme is not apparently affected in other tissues, for example, liver. Of interest also are the recent findings that conversion of undrogens to oestrogens take place in adipose tissue, which suggests that adipose tissue may be a significant extragonadel source of oestrogens. [Liu & Lee,(1998)]. The unsaturated fatty acids of the vegetable fats are almost exclusively of the cis configuration and the double bonds are located at the Δ9 and Δ9, 12 positions of the monoenes and dienes, respectively[Ratnayake & Pelletier,(1992)]. T.F.AS. are found in small concentrations in dairy products, but most of them in the diet arise from the hydrogenation of oil. Trans-isomers are formed during partial hydrogenation of unsaturated fatty acids by some ruman micro-organisms or by commercial processing of vegetable oils . Analytical data on the fatty acids composition of partially hydrogenated oils indicate that margarines and shortenings may contain 15-60% trans -fatty acid isomers, under some processing condition the main trans fatty acid is elaidic acid [Mosssoba, *et al.*,(1990)].

Accordingly, with a continuing increase in consumption of processed fats and oils, the amount of T.F.AS. in the diet has increased markedly and causing different harmes as well as it is related to ather osclerrosis and a host of other diseases such as accumulated of serum cholesterol and triglyceride levels in man and animals. The T.F.AS. have also been shown to accentuate essential fatty deficiency, to cause an increase in swelling rate of mitochondria, to contribute in increasing the rate of erythrocyte hemolysis, and to inhibit the growth of some micro-organisms. T.F.AS. are incorporated into most body tissues of experimental animals and humans and into human breast milk [Picciano & Perkins, (1997)]. One aspect of T.F.AS. that has received great attention in their relation to essential fatty acid metabolism. Number of investigation in vivo have provided evidence that hydrogenated fats and specific fatty acid isomers can influence the activity of the desaturases, elongases, acyl trans ferases, oxygenases and prostaglandin synthetases .

It seems possible that high concentrations of T.F.A. isomers, as found in hydrogenated dietary oils, could also adversely affect the reproduction of laboratory rats thougth that effect would be more probable at lower levels of essential fatty acids [Emken, (1984)].

Stability and sensory properties of frying oils are influenced by the characteristics of the oil, the product being fried and by the lenght of time of use [Ratnayake & pelletier, (1992)]. The formation and accunulation of higher - molecular - weight compounds during frying are responsible for chemical changes, such as increase in free fatty acid (F.F.A.) , carbonyl value and hydroxyl content and decrease in unsaturation. [Cheah, *et al.*, (1992)] Also, for physical changes, such as increase in color and (M.P). Thus, they are a reliable indicator of fat deterioration [Mazza and Qi, (1992)].

The basic hydrogenation process of edible oils means conversion of liquid oils into semi - solid substances with desired melting point (M.P)

characteristics and partially hydrogenated oils of increased stability [Rusnac, *et al.*, (1992) and smidounik, *et al.*, (1992)].
As much less information about the amount of T.F.AS found in foods contained especially hydrogenated oils, the present study are foucused on the trans fatty acids determination in some vegetable fats, beside the more important physical and chemical properties of these fats .

MATERIALS AND METHODS

1- MATERIALS:-

Nakawa local market (N.L.M.) , Hydrogentated palm oil (H.P.O.) 100% at 55 °C ; Awdony local market (A.L.M.) and Iraq shortening for Export (I.S.F.E.) were obtained from Misr for Oils and Soap Company, El Mansoura ,EGYPT.

1-1 Standards:-

Elaidic acid methyl ester [trans- 9 octadecenoic acid methyl ester] Sigma grade 99% was obtained from. sigma chemical company, st. louis, MO., USA.Cairo Office for Chemicals . EL-Manyal, Cairo.

1-2 Solvents :-

Carbon disulphide was obtained from Riedel , Germany ,Cairo Office for chemical , El-Manyal, Cairo, but other solvents such as ethanol and chloroform were obtained in a highly pure state and distilled before use .

2- METHODS:-

2-1 Physical Analysis:-

a) Refractive Index (R.I.) was determined at 60 °C according to the A.O.A.C. method (1990) by using Refractometer laboratory JNY RL3 , Poland .
b) The melting point (M.P.) was determined at 25 °C according to the A.O.A.C. method (1990).
c) Color was determined by lovibond tintometer as red units , when the yellow reading adjusted at 35 units .

2-2 Chemical Analysis :-

Acid Value [as oleic acid percent (A.V.)] , Peroxide Value [mel. eq/kg. oil (P.V.)] , saponification value (S.V) and iodine value (I.V.) were determined according to the method described in A.O.A.C. (1990).

Ester value was calculated as indicated by A.O.C.S. (1964) by subtracting the acid number from saponification as follows :-
Ester value = saponification value - acid number .

Glycerol content was calculated according to Abd-EL-Akher, (1967) as follows :-

Glycerol % = ester value x 0.054664

3- Determination of trans fatty acids by infra red spectrophotometeric analysis:-

Infra red spectrophotometer was used to identify the trans fatty acids content in the fats under investigation by using Pye Unicam SP3-300 infra red spectrophotometer (Philips) according to AOCS,(1978).

4- Colormetric determination of total tocopherols in vegetable fat from local market:

Two hundred ± 10 mg of the oil samples are weighed accurately into a 10 ml. volumetric flask five ml. of toluene one half ml. of 224 bipyridine (0.07% w/v in 95% aqueos ethanol) and 0.5 ml. of Fe cl_3 .6 H_2O (0.29% w/v in 95% aqueous ethanol) are added in toluene. the solution is made up to 10 ml. with 95% aqueous ethanol. After standing for one min. the absorption at 520 m is determined using as a reference a blank solution ,repared as above but omitting the oil 10. solutions should be protected from strong light during Coo development. The method was calibrated by preparing stander is containing 0.240µg of pure α- tocopherol in 10ml. of toluene and then analyzing as above. The concentration of tocopherol in the sample was calculated according to wong,*et al.*,(1983) as:

Total Tocopherol (ppm) = (A-B) M.W.

Where:-

A= absorption of sample in 10um cell.

B= absorption of blank in 10 m cell.

M=gradient of absorption us weigh graph for α-tocopherol calibration was ca. 0 x 10 absarbance/µg α-tocopherol

W= weight of sample in gm.

5- Fatty acids analysis:-

Fatty acids were determined by gas liquid chromatography (GLC) of methyl esters prepared by the procedure of Kates, (1964). The fatty acid methyl esters were analyzed by using PYE-Unicom Model 104 gas chromatography as described by Rady, *et al.*,(1987).

6- Determination and identification of unsaponifiables by glc :-

The sterol esters were analysed by PYE-Unicom GVC gas chromatography equipped with flam ionization detector and dual column (2.8 mx 4 mm) packed with 1% OV-17 supported on acids , alkali washed at silanised Diatomic c (100/120 mesh) was used . The sample (Ca 0.2 ul) was injected into the column while the gas chromatographic conditions used for isothermal analysis were as follows :-

Column temperature 270 °C. detector temperature 300 °C , injection temperature 280 °C flow rates nitrogen 30 ml / min. , hydrogen 33 ml/min. , and air 330 ml/min.

A set of standard methyl esters of B-sitosterol , stigmasterol , and cholesterol were used as authentic standard to enable the characterization of the unknown sterols (unsaponifiable matters) by reference to their retention time (R.T.).

The area of each peak , representing the sterol methyl ester , was measured by calculating the area of the triangle formed by drawing two tangents through the inflection points of peak , the base line being the triangle base . the area of the triangle thus formed was calculated by multiplying peak height by the width at half peak height according to Mc Nair & Bonelle, (1969). The percentage composition of sterol was calculated from the following equation .

$$\text{Sterol \%} = \frac{\text{Area of each peak}}{\text{Overall area of peaks}} \times 100$$

7- **Stability** :-

The oven test method suggested by Thompson, (1966) oven at 63 °C± 0.5 °C .

RESULTS AND DISCUSSION

The physical and chemical properties:-

The physical and chemical properties are considered as important tools for oils and fats analysis.

The physical properties of some vegetables butter fat from local market were determined to give an idea about their constituents. The data of fat analysis was represented in Table (1), it could be observed that the refractive index at 60 C° (R.I.) was decreased during hydrogenation of an oil because the presence of low concentration of unsaturated fatty acids in an oil lead to a decrease in its R.I. . Slight differences could be noticed in the R.I. of sample 2 (HPo 100% at 55 c), sample 1 (NLM) and sample 4 (ISFE) were 1.4465, 1.4485, 1.4489, respectively which were quite lower than that of sample 3 (ALM) was 1.4513.

Melting Point (M.P.):-

The melting point at 25°C (M.P.) was also determined and the results in Table (1) show that M.P. of sample 2 (55.0°) was higher than that of other samples. This could be attributed to the higher content of saturated fatty acids.

Color:-

The color of sample 2 recorded the highest value at measurement the lovibond unit (4.1) [Gümüskesenand temel, (1992)] it may be due to its high content of pigmenets such as carotene and chlorophyll as explained from palm fruits contained 0.05-2.0% carotene. But sample 4 shows (3.2) while the color of sample 3 and sample 1 were markedly low which recorded 2.9 and 2.7, respectively.

Table (1): The physical proparties of vegetables butter fat from local market.

No.	Samples	R.I. at 60 °C	M.P. at 25 °C	Color
1	Nakawa local market	1.4485	43.5	2.7
2	Hydrogenated palm oil 100 % at 55 °C	1.4465	55.0	4.1
3	Awdony local market	1.4513	41.5	2.9
4	Iraqe shortening for export	1.4489	40.5	3.2

R.I : Refractive index at 60°C **M.P :Melting point at 25°C**

color : was determined by lovibond tintometer as red unit, when the yellow reading adjusted at 35 unit .

The chemical properties:-

From the results in Table(2) it could be noticed that the (A.V.) was very low in all samples. Such low acidity indicates that no or less hydrolysis in the fats were happened in all samples { mazza and Qi, (1992)} .

Table (2): The chemical properties of vegetables butter fat from local market.

No.	Samples	A.V.	P.V.	S.V.	I.V.	Unsa.	Ester value	Glycerol %
1	Nakawa local market	0.045	1.6	205.60	34	0.98	205.555	11.236
2	Hydrogenated palm oil 100 % at 55°C	0.090	0.4	199.25	51	1.10	199.160	10.887
3	Awdony local market	0.119	2.0	200.65	36	1.00	200.531	10.962
4	Iraqe shortening for export	0.030	0.7	202.32	55	0.78	202.290	11.058

A.V. : Acid value. **P.V. : Peroxide value.**
S.V. : saponification value. **I.V. : Iodine value.**
Uns. : unsapoinfication matter.
Ester value = saponification value - acide number.
Glycerol% = Ester value X 0.054664

Acid value (A.V.):-

The acid value (A.V.) of NLM was recorded 0.045 which was approximately similar to that of ISFE (0.030), While it was 0.090 for HPO 100% at 55°C . The highest value of A.V for sample 3 was recorded (0.119).

Peroxide value (P.V):-

The peroxide value (P.V) is not a constant of any oil but it is rather a reflection of its tendency towards oxidation. The results are shown in Table(2) showed that the P.V was low in the fat samples except that of NLM (1.6) and ALM (2.0) Low P.V may be due to the freshness of the fat { king, *et al.*,(1998) and Kokken & Hendren, (1992)}.

Saponification value (S.V):-

Saponification value (S.V) of a fat gives an idea about the nature of the chain length of the fatty acid.

Saponification value (S.V.) which is a reflection for the average molecular weight of fatty acids, was found to be 205.6 for sample 1 which indicates of its higher content of short chain and 202.32 for sample 4, while it was 199.25 for sample 2, sample 3 has an intermediate S.V 200.65.

Iodine value (I.V):-

The iodine value (I.V) in fats reflects the degree of unsaturation especially when measured for untreated oils. Accordingly, PO is considered to be a non-drying oil since its I.V is below 90. From result in Table (2) it could be observed that the I.V of sample 1, sample 2 , sample 3 and sample 4 were 34,51,36 and 55, respectively { Nagendrappa, *et al.*,(1998) and Man, *et al.*, (1993) }.

Unsaponifiable matters:-

The unsaponifiable matter of sample are relatively low being 0.98 and 0.78 for NLM and ISFE, respectively, while it is found to be 1.1 for HPO100% at 55°C {Gümüskesen and Temel (1992)} and 1.00 for ALM. Such matter have favourable effect on the oil stability.

The ester value of NLM, ISFE and ALM were 205.555, 202.290 and 200.531, respectively comparing with 199.160 for HPO at 100% at 55°C .

Glycerol content %

It is know that glycerol contributes to about 10% of glycerides, depending on the average molecular weigh of fatty acids. Then the glycerol content of triglycerides (TG) would be high and vise verse { Jacobs, (1958) } in this study the glycerol content of HPo 100% at 55°C 10.887% and ALM 10.962% were approximately Similar to that of ISFE 11.058%. the NLM had the highest value of glycerol content 11.236% indicating the presence of short chain fatty acids in amounts greater than those in the other studied fats, as may be, to some extent, confirmed by higher S.V. in the former case.

Trans fatty acids (T.F.AS.):-

The percentage of trans fatty acid as elaidic acid was determined using IR spectrophotometric analysis and the results are present in Table (3). It is clear that the percentage of TFAS content of fats in different market vegetable butter fats ranged from 12.84% in ALM which consists of palm oil (Po) to 58.40% in HPO 100% at 55°C which contains hydrogenated oil.

It is in accordance with the statement that the hydrogenation of an oil leads to formation of a significant amount of trans isomers of fatty acids [Morgado, *et al.*, (1998)].

Results in Table (3) also show that NLM contains 28.45% T.F.A.S. This result is in agreement with Wolff, (1993) who mentioned that the formation of linolenic geometrical isomers (LGIS) in linseed oil increases with both heating time and temperature.

Moreover, It is possible to support the fat with small amount of an oil to reach to the desired M.P. and the enough content of the essential fatty acids [Alexander ,(1981)].

It is clear that the M.P. were decreased and the I.V. were increased in sample 4 than other ones. On the other hand, the percentage of trans fatty acids were lower in sample 3 than other ones.

Table (3): Trans fatty acids % in some vegetable butter fat from local market.

No.	Samples	Trans fatty Acid %
1	Nakawa (local market)	28.45
2	Hydrogenated palm oil 100% at 55 C°	58.40
3	Awdony (local market)	12.84
4	Iraqe shortening (For Export)	23.16

Tocopherols (Tocol)%

Tocopherols (Tocol) are important miner component of oils and fats because of their antioxidant properties. They are especially important in palm oil (PO) because of the uniquely long shipment and storage time. Tocopherols are also important nutritionally because of their vitamin E activity [Battino, *et al.*, (2002) ,king ,*et al.*,(1998) and liu & Huang ,(1995)].

Results concerning the Tocols. Of vegetable butter fats are shown in Table (4). The results for sample 3 show lower levels 10.03% and the greater variability than the greater percentage was 22.17% for HPO 100% at 55°C

Table (4): Total Tocopherols % in some vegetable butter fat from local market.

No	Samples	Total Tocopherols %
1	Nakawa local market	13.94
2	Hydrogenated palm oil 100% at 55 °C	22.17
3	Awdony local market	10.03
4	Iraqe shortening For Export	17.64

Fatty acids composition:-

Table (5) showed GLC data of fatty acid methyl esters (FAMES) derived from vegetable butter fat from local market. The data displayed that palmitic (C16:0) and oleic (C18:1) were the dominant fatty acids in NLM, HPO 100% at 55°C, ALM and ISFE, these results are similar with those found by Nor Aini, *et al.*, (2005), Akubuo &Eje, (2002) and khalil & Awatif ,(1996)]. The total saturated fatty acids exhibited about 41.412, 54.380, 42.703,and 46.923 while the total unsaturated represented about 58.588, 45.620, 57.297 and 53.077. Thus ,ratio of unsaturated/saturated fatty acids were 1.41:1, 0.83:1, 1.34:1 and 1.13:1, respectively.

Table (5): Fatty acid % composition of vegetable butter fat from local market.

peak	Sample		Sample		Sample		Sample	
	R.T.	1	R.T.	2	R.T.	3	R.T.	4
1-unknown	3.949	0.069	3.811	1.268	3.792	0.847	3.787	1.103
2-$C_{16:0}$	5.770	35.760	5.874	47.419	5.747	37.275	5.772	40.826
3-unknown	7.157	0.592	6.942	0.115	6.005	0.202	6.906	0.138
4-unknown	7.719	0.225	7.201	0.018	.....	.....	7.193	0.101
5-$C_{18:0}$	8.427	4.328	8.593	5.053	8.409	4.379	8.425	3.828
6 -$C_{18:1}$	8.773	26.763	8.869	44.433	8.737	32.221	8.782	35.388
7 -$C_{18:2}$	9.490	8.893	9.534	0.805	9.474	17.139	9.484	9.065
8 -$C_{18:3}$	10.927	4.196	10.950	0.182	10.527	1.275	.....	0.314
9-$C_{20:0}$	12.233	0.438	12.239	0.507	.....	.....	12.229	0.927
10-unknown	12.731	1.084	12.734	0.200	12.735	1.532	12.717	0.890
11-unknown	13.936	2.661	.....	.....	13.596	5.131	13.594	2.868
12-unknown	14.279	14.991	.....	.....	.....	.....	14.290	2.581
13-unknown	.....	.....	.....	.....	.....	.....	14.967	1.843
14-unknown	.....	.....	.....	.....	.....	.....	20.987	0.128
Total satura.		41.412		54.38		42.703		46.923
Total unsat.		58.588		45.62		57.297		53.077
Total		100.00		100.00		100.00		100.00
Unsa. / sat.		1.41:1		0.83:1		1.38:1		1.13:1
T.sat/T.unsat		0.71:1		1.20:1		0.75:1		0.88:1
$C_{18:2}$ / $C_{18:1}$		0.33		0.02		0.532		0.256

sample (1) : Nakawa local market
sample (2) : Hydrogenated palm oil 100% at 55°C.
asmple (3) : Awdony local market .
sample (4) : Irage shortening for export.

It is obvious that the vegetable butter fat from local market (VBFFLM) had no markedly effect on the fatty acids composition of the fat [Narasimhamurthy ,(1999)], since the differences between the four samples

of fat was not noticeable with exception of arachidic (C20:0) of sample 4 was 0.927 which they were slightly higher in comparison with those found in other samples. In contrast ,linoleic (C18:2) and linolenic (C18:3) detected in sample 2 HPO 100% at 55°C were lower than those recorded in other ones.

The major saturated fatty acid found in HPO 100% at 55°C is palmatic acid (C16:0) which represented 47.419% from the total fatty acid. On ther hand, oleic acid (C18:1) recorded the highest content of unsaturated fatty acid (44.433) for sample 2 ,whereas the stearic acid (C18:0) was found in minor amount 3.828% for Sample 4 [Nagendrappa ,*et al.*,(1998) and Nor Aini, *et al.*,(1998)].

Generally, the peculiar feature of fat in the present study is the relatively high content of saturated fatty acids.

Unsaponifiable matter compounds:-

Unsaponifiable matters of vegetable butter fat from local market were identified and percentage of each fraction was calculated as shown in Table (6). It indicated that, induced drastic change in the unsaponifiable matter components of sample 3 contained C23 (0.948%); C24 (2.636%), C25 (21.592%), C28 (22.659%) and C30 (3.704%) against C23 (7.845%), C24 (0.758%), C25 (44.890%), C28 (14.325%) and C30 (0.264%) of sample2. Among the hydrocarbon, C25 is considered as an important components. It represented 47.200, 44.890, 21.592 and 5.252% for Sample 1, 2, 3 and Sample 4, respectively.

Table (6): Unsaponifiable matter (%) composition of vegetable butter fat from local market.

Peak		Sample		Sample		Sample		Sample	
		R.T (Mins)	1	R.T (Mins)	2	R.T (Mins)	3	R.T (Mins)	4
1		.....	.....	.....	.....	2.783	32.813	.....	.....
2		.....	.....	.....	.....	4.117	0.300	.....	.....
3	C12	.....	.....	.....	.....	7.433	0.130	.....	.....
4	C15	.....	.....	.....	.....	8.800	3.085	.....	.....
5	C18	.....	.....	.....	.....	10.633	1.287	.....	.....
6	C21	14.067	5.988	.....	.....	.....	.....	.....	.....
7	C22	15.217	0.788	.....	.....	15.250	6.046	.....	.....
8	C23	15.567	0.195	15.717	7.845	15.667	0.948	.....	.....
9		.....	.....	.....	.....	.....	.....	.....	.....
10	C24	.....	.....	16.483	0.758	16.617	2.636	.....	.....
11	C25	17.150	47.200	17.650	44.890	17.817	21.592	17.733	5.252
12	C26	18.900	36.858	.....	.....	.....	.....	.....	.....
13	C27	.....	.....	.....	.....	19.200	2.165	.....	.....
14	C28	.....	.....	19.600	14.325	19.733	22.659	.....	.....
15	C29	20.533	5.696	.....	.....	.....	.....	.....	.....
16	C30	.....	.....	21.467	0.264	21.350	3.704	.....	.....
17	C31	22.233	3.275	22.783	31.918	.....	.....	.....	.....
18	C32	.....	.....	.....	.....	23.417	2.388	23.250	94.748
CHo		.....	.....	.....	.....	.....	.....	.....	.....
Stigma		.....	.....	.....	.....	28.083	0.248	.....	.....
B . sito		.....	.....	.....	.....	.....	.....	.....	.....
Total			100.00		100.000		100.001		100.00

sample (1) : Nakawa local market . sample (2) : Hydrogenated palm oil 100% at 55°C.
sample (3) : Awdony local market . sample (4) : Irage shortening for export .

It was cleary observed from results obtained in Table (6) that the hydrocarbons compound C21 [5.988%], C26 [36.858%] and C29 [5.696%] were detected in sample (1) only. Mean while C32 showed a noticeable increase in sample 4 [94.748%], while the reverse trend was occurred in sample 3 [2.388%].

On the other hand, it was found that the content of C31 had the highest percentage 31.918 in sample 2 . while the sample 1 had the lowest percentage of 3.275 on the contrary to that, the C23 of sample 2 had the highest value 7.845%, while the lowest value was reported 0.195% for sample 1.

The same picture was also observed in the predominant sterol [stigmasterol], the average value was 0.248% for sample 3

Stability of fats:-

Stability of edible oils is one of the most important characteristics from the view point of nutrition as well as the economies of oil industry. In the present work this property was determined through holding oil samples in an oven at 63°C and checking them at certain and regular intervals for peroxide value. Results obtained are shown in Table (7).

It is well known that, the course of oil oxidation includes two stages, the first of which is known as the induction period. The latter period is characterized by a fluctuation in the determined peroxide value. That could be due to the formation and breakdown of the formed peroxide. The end of that period is characterized by a steady increase in this value. From Table (7) ,it is evident that the induction period in case of. This observation goes in agreement with those obtained by Alaa, (2000).

Table (7):- Changes Which accured in the peroxide value during oven at 63°C.

Time Hrs.	p.v.			
	1	2	3	4
Zero	1.600	0.400	2.000	0.700
48	2.550	1.217	2.657	4.886
120	3.860	2.550	4.107	12.515
360	16.831	1.007	3.362	24.285
576	2.900	0.040	0.560	2.600
744	224.35	1.240	267.79	223.37

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تقييم بعض الدهون النباتية الموجودة في السوق المحلية

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نظرا لأهمية المسلى الصناعي النباتي لسد جانب هام من جوانب الفجوة الغذائية اللازمة والصالحة للاستخدام الادمي

فقد هدف هذا البحث إلى تقييم بعض انواع المسلى النباتي المتوفرة في السوق المحلى بغرض الوقوف على جودتها وقيمتها الغذائية ومدى صلاحيتها للاستخدام. وقد اوضحت الدراسة النتائج التالية:-

١. أظهرت الدراسة تباين طفيف في معامل الانكسار بين عينات الدهون النباتية موضع الدراسة والتي أوضحت تناقص معامل الانكسار مع الهدرجة.
٢. أظهرت العينة رقم ٢ ارتفاع في نقطة الانصهار واللون عن العينات الأخرى وقد أوضحت الدراسة إن ذلك يعود لارتفاع محتوى العينات من الأحماض الدهنية المشبعة.
٣. أوضحت الدراسة انخفاض رقم الحموضة للعينات المختبرة وهذا يرجع إلى عدم وجود تحلل لعينات الزيت موضع الدراسة.
٤. كانت قيم رقم البيروكسيد منخفضة هي الأخرى فيما عدا رقم البيروكسيد للعينة رقم ٣.
٥. اختلف رقم التصبن للعينات المختبرة وذلك لتباين محتواها من الأحماض الدهنية وهذا يرجع لارتفاع نسبة الأحماض الدهنية قصيرة السلسلة في عينات الزيت موضع الدراسة.
٦. كان الرقم اليودي للعينات المختبرة هو ٥٥،٣٦،٥١،٣٤ على الترتيب للعينة من رقم ١ إلى رقم ٤.
٧. المواد الغير متصبنه كانت قليلة نسبيا في العينات المختبرة في حين كان رقم الإستر لها مرتفع.
٨. العينة رقم ١ محتوى عالي من الجليسرول عن العينات الأخرى.
٩. ظهرت بالعينات كمية صغيرة من الأحماض الدهنية المخالفة (Trans) وهذا راجع لعملية الهدرجة التي حدثت للزيوت والتي أدت إلى تكون trans isomer من الأحماض الدهنية.
١٠. أظهرت الدراسة محتوى عالي من التوكوفيرول في العينة رقم ٢ المقارنة بالعينات الأخرى.
١١. كما أظهرت الدراسة ارتفاع نسبة الأحماض الدهنية في العينات وبخاصة العينة رقم ٢ والتي احتوت على أحماض البالمتيك والاستياريك والاوليك واللينوليك كما ظهرت أحماض أخري مثل الارشيدويك. فقد دلت النتائج على احتواء عينات الزيت على الاحماض الدهنية المشبعة والغير مشبعة.
١٢. وبدراسة ثبات هذه الزيوت أو الدهون النباتية دلت على ارتفاع رقم البيروكسيد خلال فترات التخزين. وبصفه عامه أوضحت الدراسة أن هذه الزيوت بخواصها الفيزوكيميائيه آمنه وصالحه للاستخدام ولن تؤدى إلى حدوث مشاكل صحية.

التوصية:-

١- يفضل استخدام السمن نقاوة محلي و عودوني محلي في التغذية.
٢- يفضل استخدام زيت نخيل مهدرج ١٠٠% لدرجة ٥٥°م في عمل مكعبات مرقة الدجاج.