J. Food and Dairy Sci., Mansoura Univ., Vol. 8 (8): 347 - 352 , 2017

Comparative Study between Synthetic and Natural Antioxidants of Banana, Mango and Orange Peels Extracts and their Effect on the Soybean and Olive Oils

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ABSTRACT

This study assayed to evaluate the effect of phenolic and flavonoids compound of banana, mango and orange peels extracts on some chemical properties of soybean and olive oils during storage period. Phenolic and Flavonoids compounds were determined by high performance liquid chromatographic method (HPLC) using ultraviolet (UV) detector set at 280 nm and 330nm, respectively. Soybean and olive oils storied (Six months) at room temperature (20 ± 2 ºC) after additional 1200 ppm banana, mango and orange peels extracts and compared with additional 200 ppm of synthetic antioxidants (BHT & BHA) The oils samples analyzed every month for acid, peroxide and iodine values during storage period. The results indicated that in the end of storage period acid and peroxide values of soybean and olive oils which treated with banana, mango and orange peels extracts (1200 ppm) were lower than other treatments , while iodine value were higher. It can be concluded that the additional of banana, mango and orange peels extracts enhanced the acid, peroxide and iodine values of soybean and olive oils in the end of storage period.

keywords: Antioxidants- Soybean oil- Olive oil- Acid value- Peroxide value- Iodine number- Fruit peels.

INTRODUCTION

Fruit peels are one of the fruit wastes and it considered a major source of natural antioxidants (Gorinstein, *et al*. 1998), (Bocco *et al*. 1998), while the peeled powder of fruit may impart health benefits when used in functional food products, due to the low-coast of these residues we can use these peels as nutritional dietary supplements for low-income communities (Oliveira *et al*. 2009).

Banana is the second largest product after citrus fruit account for only around 16% of global world product. India is contributing 27% of the world for banana production (Mohapatra *et al*. 2010). Banana (*Musaceae*) enormous by-products are an excellent source of highly valuable raw materials for other industries (Padam *et al*. 2014). Banana peels is an abundant and low cost agricultural waste residue, it is easily available in large quantities, and it accounts for about 40 % of the weight of the raw fruit and it is rich in protein, carbohydrates, various vitamins and mineral elements (Ramli *et al.* 2009), (Dhabekar and Chandak 2010). Banana peel is known by its local and traditional use to promote wound healing mainly from burns and to help overcome or prevent a substantial number of illnesses, as depression (Pereira and Maraschin 2015). Applications of bioactive constituents from banana peels should not be limited to nutraceuticals for direct human consumption, but must extend to further exploit as natural preservatives for foods (Mokbel and Hashinaga 2005).

In Egypt mangoes are the most popular fruits and are cultivated almost in the whole of the Nile valley and around the desert. There are several varieties grown in Egypt, the better known cultivars are alphonso, balady, pairi, mabroka, zebda, and succary (Elsoukkary *et al*. 2000). Egypt produced more than four million tons of mango fruit in 2004/2005 (Ministry of Agriculture 2005). Several million tons of mango wastes are produced annually from factories. Because mango is a seasonal fruit, about 20% of fruits are processed for products such as leather, puree, nectar, pickles and canned slices among others, which have worldwide popularity (Ashoush and Gadallah 2011). The main by-products of processing mangos are the peels, the seed and fibers. Approximately, 0.5% of world mango production is used to obtain derived products; therefor the amount of bio-waste produces by processing industries is estimated to be around 75 million tons worldwide (Dorta *et al*. 2012). Mango peel as a by-product of mango processing industry could be a rich source of bioactive compounds, and enzymes such as protease, polyphenol oxidase, peroxidase, carotenoids, vitamins C and E, dietary fibers, and carbohydrate content (Ajila *et al*. 2007), and these peels constitutes about 15–20% of total weight of mango fruit (Ajila and Rao 2013).

The sweet orange types (citrus *sinesis*) are widely grown throughout the world and provide the greatest fruit marketing production, the many known cultivars can be subdivided into three main groups as the acid less or sugar oranges: common oranges (also known as whit or blond oranges), navel oranges and blood or pigmented oranges (Nagy *et al*. 1997). Whole peel or rind (pericarp) amount to less than 40% of the citrus industrial wastes whole peel is used for such products as candied, marmalade, brined, or dried peel, bioflavonoids, limettin, tangeretin, and peel seasonings. Combined with the pulp residue, it is used in the manufacture of feed for animals, molasses, alcohols, syrups and or distilled oils. The citrus fruits peel consists of an exterior yellow peel (epicarp) called flavedo and an interior white syrups peel (mescocarp) called albedo (Soliman 2011).

Food preservation plays a vital role in driving the food industry by extending the shelf life of foods. Current trends of industry show increase awareness towards the drawbacks of synthetic chemical preservatives and opt for minimally processed food or employing natural techniques in food preservation (Tiwari *et al*. 2009). The free radicals found in the living organisms causes oxidative damage to different molecules such as lipids, proteins, nucleic acids and these are involved in the interaction phases of many degenerative diseases (Ajila *et al*. 2007a). The antioxidant capacity can be explored in food industry by using wastes as a source of antioxidants to prevent the

rancidity and oxidation of lipids. In fact, in recent years, research has focused on fruit peels to extract natural and low-cost antioxidants that can replace synthetic additives such as butylatedhydroxyanisole (BHA) and butylatedhydroxytoluene (BHT) that might be carcinogenic and even toxic (Whysner *et al*. 1994).

Soybean oil is one of the most vegetable oils spread, it used directly in food. The use of soybean oil in Egypt had begun from the year 1976 (El-Agroudy *et al.* 2011).

Virgin olive oil is credited as being one of the many healthful components; it is reduced incidence of chronic inflammatory disease, and is rich in phenolic compounds and the health promoting benefits (Parkinson and Cicerale 2016), when compared to other vegetable oils such as sunflower, cottonseed, corn and soybean oil, olive oil has a significantly lower rate of alteration and it can be stored for 18 months or more (Frank 2011).

Olive oil seems that its biophenols may scavenge free radicals, attracting distinct attention due to their beneficial effects in many pathological conditions, such as cancer (Kouka *et al.* 2017), some of the most important biophenols found in olive oil with marked biological activities, are oleacein, oleocanthal, elenoic acid, oleuropein and its derivatives, hydroxytyrosol and tyrosol. These compounds have the ability to scavenge free radicals by donating them hydrogen atom or an electron by chelating metals (Montaño *et al*., 2016), (Lewandowska *et al.* 2013).

Consequently, this investigation aims to evaluate the chemical composition of banana, mango and orange peels, and effect of phenolic and flavonoids content of banana, mango and orange peels extracts on some chemical properties of olive and soybean oils during storage period.

MATERIALS AND METHODS

Materials

Bananas (*Musaceae*), mango zebda (*Mangifera indica* L.), orange peels (citrus *sinesis*), soybean (*Glycine max*), and olive oils *(Olea europaea*) were obtained from local market in Egypt. Chemicals were purchased from Elgomhoria Company, Cairo, Egypt.

Methods

Banana, mango and orange peels were cleaned from extraneous matter and properly washed with tab water, then dried in air-oven for 24 h at 40 ºC and then crushed into fine powder.

The dried banana, mango and orange peels ground in a blender to form powder, thereafter, 10 g of the powder macerated in 100 ml absolute ethanol and the extraction repeated three times. The extracts filtered through "Whatman" filter paper (No. 40) and concentrate in a rotary evaporator under reduced pressure.

Soybean and olive oils stored (Six months) at room temperature (20 ± 2 C°) after additional 1200 ppm banana, mango and orange peels extracts and 200 ppm synthetic antioxidants (BHT & BHA). Control soybean and olive oils and treated samples with extracts analyzed every month for acid, peroxide and iodine values during storage period.

Gross chemical composition:

Moisture, crude protein, crude lipids, ash and crude fiber content of the banana, orange and mango peels were determined according to the method described by (AOAC 2000).

Carbohydrates content was calculated by difference from the following equation:

Carbohydrates content % =100 – (Protein + Moisture + Ash + Lipids + Fiber)

Chemical properties of oils:

Acid, peroxide and iodine values were determined according to (AOAC 2000).

Determination of Flavonoids Compounds:

Flavonoids compounds were determined by HPLC according to the method of (Mattila *et al.* 2000).

Determination of phenolic compounds:

Phenolic compounds were determined by HPLC according to (Goupy *et al*. 1999).

Statistical analysis:

The statistical evaluation of the mean ± stander deviation data was compared using one-way analysis of variance (ANOVA) according to (Zar 1984).

RESULTS AND DISCUSSION

1- Gross chemical composition of banana, orange and mango peels.

Table (1) shows the gross chemical composition of banana, orange, and mango peels. It can be noticed that the moisture, crude protein, fat, ash, fiber and carbohydrate contents for banana peel were 8.125, 7.438, 3.570, 7.800, 13.05 and 31.858 % respectively. Such results are in agreement with those obtained by (Marconi *et al.* 1997), (Chen *et al.* 2011) and (Kurhade *et al.* 2015).While chemical compositions of orange peels were 10.945, 6.300, 3.775, 2.200, 9.07 and 21.34%, such results are in agreement with those obtained by (Soliman 2011). Moreover chemical composition of mango peel was 8.450, 3.850, 6.330, 8.050, 11.98 and 30.21%. These results are in agreement with those obtained by (Larrauri and Cerezal 1993) and (Mostafa 2006).

Table 1. Chemical composition of banana, orange and mango peels.

%	Banana peel	Orange peel	Mango peel
Moisture	8.125±0.709	10.945±0.099	8.450± 0.058
Crude protein*	7.438±0.226	6.300±1.134	3.850±0.143
Total lipids*	3.570±0.159	3.775±0.689	6.330±0.242
Ash content*	7.800±0.216	2.200±0.183	8.050±0.129
Fiber*	13.05	9.07	11.98
Carbohydrates*	31.858	21.345	30.21

Values are means of four replicates ± stander deviation
***On dry weight basis**

2- Flavonoids content of banana, orange and mango peels extracts

Table (2) show the flavonoids content of banana, orange and mango peels extracts. From this table, it could be noticed that hispertin is the predominant flavonoid compound (247.36 ppm) in banana peel extract, followed by rutin (198.07 ppm), these results are in agreement with (Anal *et al*. 2014). Concerning

orange peels extract, it was found that these peels contain more contents of flavonoids than those present in banana peels, the predominant compound is hisperidin (2957.43) followed by rosmarinic and quercetrin (992.15, 922.10 ppm respectively), these results are in agreement with (Sawalha *et al*. 2009). Mango peel extract contains the least flavonoid compounds and the predominant flavonoid compound hisperidin (1421.29 ppm).

Table 2. Flavonoids content of banana, orange and mango peels extracts (ppm).

Flavonoids	Banana peel extract	Orange peel extract	Mango peel extract
Luteolin	9.85	207.07	145.97
Narengin	36.77	510.78	239.36
Rutin	198.07	771.97	1181.38
Hisperidin	73.29	2957.43	1421.29
Rosmarinic	46.17	992.15	297.85
Quercetrin	64.07	922.10	155.14
Quercetin	115.47	496.16	81.08
Hispertin	247.36	800.10	51.57
Kampferol	36.92	77.29	95.23
Apegnin	8.22	85.13	10.55

3- Phenolic compounds of banana, orange and mango peels extracts

Table (3) illustrates the phenolic compounds of banana, orange and mango peels extracts. From this table it could be noticed that salycillic is the predominant flavonoid compound (735.23 ppm) in banana peel extract followed by pyrogallol (706.77 ppm), these results are confirmed by (Pereira and Maraschin, 2015).

Table 3. Phenolic content of banana, orange and mango peels extracts (ppm).

Phenolic Compounds	Banana peel extract	Orange peel extract	Mango peel extract
Gallic	110.72	80.02	2331.04
Pyrogallol	706.77	943.86	13510.61
4-Amino-benzoic	35.25	114.26	207.04
3-OH-Tyrosol	236.39	670.61	1670.16
Protocatchuic	254.92	1515.43	2238.85
Chlorogenic	308.12	802.02	1966.51
Catechein	79.96	512.61	3951.10
Catechol	30.59	266.87	360.03
Caffeine	23.45	440.35	336.87
P-OH-benzoic	96.23	581.21	996.11
Caffeic	178.00	250.13	1813.56
Vanillic	77.51	146.05	290.15
p-coumaric	47.00	349.12	529.03
Ferulic	93.82	429.86	210.85
Iso-ferulic	19.72	84.33	125.03
Reversetrol	18.94	202.90	162.58
Ellagic	28.54	308.77	1029.48
E-vanillic	-	-	4234.46
Alpha-coumaric	65.74	210.42	372.88
3,4,5-methoxy-cinnamic	89.29	234.57	252.43
Coumarin	14.60	95.17	20.21
Salycillic	735.23	1363.45	1340.83

Concerning orange peels extract, it was found that these peels contain more contents of flavonoids than those present in banana peels, the predominant compound is protocatchuic (1515.43 ppm) followed by salycillic (1363.45) ppm, the same trend of results are in agreement with (Ma *et al.* 2009). Mango peel extract contain the highest flavonoid compounds, the predominant compound is pyrogallol (13510.61), followed by e-vanillic (4234.46), these results are in agreement with (Tunchaiyaphum *et al.* 2013) and (Saafan 2014).

4- Changes in soybean oil treated with peel extracts during storage for 6 months

From data tabulated in table (4) it can be noticed that the acid value of soybean oil (control sample) increased from 0.156 at zero time to 0.549 at the end of storage period, these results are confirmed by (Williams 1966). Moreover the same table (4) showed the acid values of soybean oil treated with synthetic and natural antioxidants gives almost similar results in the end of storage period and a significant ($P \leq 0.05$) reduced the whole acid values compared with control sample. These results are confirmed by (Race 2009). It can be assayed that antioxidants inhibit or retard the oxidation of lipid through its action as hydrogen or electron donors. Therefore, antioxidant interferes with the radical chain reaction by forming non-radical compounds that will not propagate further radical reaction (Madsen *et al*. 1997). Also from results in table (4) it can be noticed that the peroxide value of soybean oil (control sample) increased from 2.500 Meq/kg oil at zero time to 8.900 Meq/kg oil at the end of storage period. These results are confirmed by (Saafan 2014). Moreover the same table 4 showed the peroxide values of soybean oil treated with synthetic and natural antioxidants gives almost similar results in the end of storage period and a significant ($P \leq 0.05$) reduced the whole of peroxide values compared with control sample. It can be explained that antioxidants are scavengers of oxygen radicals or hydrogen radicals that have been proposed to be agents that attack poly unsaturated fatty acids in cell membranes, giving rise to lipid peroxidation (Zien El-Dien 1999). From the same table (4) showed the iodine value of soybean oil (control sample) decreased from 135.994 at zero time to 122.881 at the end of storage period which appears the oxidation of control sample. These results are confirmed by (Williams 1966). Moreover, it can be concluded that the iodine values of soybean oil treated with synthetic and natural antioxidants gives almost similar results and a significant ($P \leq 0.05$) increases the whole iodine values compared with control sample in the end of storage period. These results are confirmed by (Ferri *et al*. 2005).

5- Changes in olive oil treated with peel extracts during storage for 6 months.

From data revealed in table (5) it can be noticed that the acid value of olive oil (control sample) increased from (0.218) at zero time to (0.611) at the end of storage period, moreover, the acid value of synthetic and natural antioxidants gives almost similar results and a significant ($P \leq 0.05$) reduced the acid values compared with control sample.

Table 4. Changes in soybean oil treated with peel extracts during storage for 6 months.

Treatments	Storage period (Months)	Acid value				Peroxide value				Iodine value			
		0	2	4	6	0	2	4	6	0	2	4	6
Control		0.156[a]± 0.01	0.262[a] ± 0.02	0.374[a]± 0.02	0.549[a]± 0.01	2.500[a] ± 0.02	4.567[a] ± 0.01	6.733[a]± 0.01	8.900[a]± 0.00	135.99 [b]± 0.37	130.28 [b]± 3.72	127.11[b]± 0.73	122.88[b]± 1.60
BHT		0.150[a]± 0.02	0.237[a]± 0.01	0.337[a]± 0.002	0.449[b]± 0.03	2.467[a] ± 0.01	4.033[b]± 0.01	5.600[c]± 0.02	7.533[b]± 0.04	136.21[b]± 0.97	135.15[a]± 1.68	132.18[a]± 1.83	129.44[a] ± 1.10
BHA		0.162[a] ± 0.01	0.243[a] ± 0.04	0.343[a]± 0.02	0.443[b]± 0.02	2.533[a] ± 0.01	4.100[b]± 0.02	5.633[c]± 0.01	7.567[b]± 0.04	137.47[a]± 0.73	134.93[a]± 2.04	132.39[a] ± 1.47	129.65 [a] ± 0.73
BPE (1200)PPM		0.156[a] ± 0.02	0.243[a] ± 0.00	0.355[a]± 0.00	0.461[b]± 0.01	2.533[a] ± 0.02	4.267[b]± 0.01	5.967 [b] ± 0.01	7.967[b]± 0.01	136.20[b] ± 0.37	134.30 [a] ± 2.04	131.34[a]± 1.10	128.59 [a] ± 0.37
OPE (1200)PPM		0.150[a] ± 0.02	0.237[a] ± 0.01	0.349[a]± 0.01	0.455[b]± 0.01	2.567[a] ± 0.01	4.033[b]± 0.01	5.767[c]± 0.02	7.767[b]± 0.05	136.20[b] ± 0.37	135.36[a]± 1.32	132.40 [a] ± 1.60	129.86 [a] ± 0.73
MPE (1200)PPM		0.156[a] ± 0.02	0.249[a] ± 0.01	0.299[b]± 0.08	0.468[b]± 0.02	2.467[a]± 0.02	4.167[b]± 0.03	5.833[c]± 0.01	7.833[b]± 0.01	136.20[b] ± 0.37	134.51[a] ± 1.68	131.55 [a] ± 1.32	128.80 [a] ± 0.63
LSD		0.031	0.033	0.065	0.034	0.157	0.157	0.139	0.297	1.03	3.95	2.47	1.68

Values are means of three replicates ± stander deviation. LSD: Least significant differences. Data were analyzed by ANOVA (Single factor P ≤ 0.05)
(BHA): butylatedhydroxyanisole (BHT): butylatedhydroxytoluene (BP): Banana peel (OP): Orange peel (MP) : Mango peel

And the peroxide value of olive oil (control sample) increased from (3.533 Meq/kg oil) at zero time to (9.800 Meq/kg oil) at the end of storage period., while the peroxide values of olive oils treated with synthetic and natural antioxidants a significant ($P \leq 0.05$) reduced compared with control sample. The same table 5 concluded that orange peel extract (OPE) 1200 ppm is the best treatment to retard the acid and peroxide values of olive oils in the end of storage period compared with other peel extracts, these retardation might be due to the effects of fruit peel extracts (flavonoids and phenols compounds) on oxidation of oils during storage, which retard the initial oxidation processes, these results are in agreement with (Kamran *et al*. 2009). From table (5) it can be noticed that the iodine value of olive oil (control sample) decreased from (92.849) at zero time to (79.101) at the end of storage period. These trends of results are in agreement with (Karleskind, 1992). Moreover iodine values of olive oil treated with synthetic and natural antioxidants gives almost similar results and a significant ($P \leq 0.05$) increased the whole values of iodine value compared with control sample in the end of storage period. These results are confirmed by (Ferri *et al*. 2005) and (Frankel *et al.* 1996).

Table 5. Changes in olive oil treated with peel extracts during storage for 6 months.

Treatments	Storage period (Months)	Acid value				Peroxide value				Iodine value			
		0	2	4	6	0	2	4	6	0	2	4	6
Control		0.218 [a] ± 0.12	0.324 [a] ± 0.11	0.436 [a] ± 0.09	0.611 [a] ± 0.10	3.533 [a] ± 0.01	5.567 [a] ± 0.01	7.667[a]± 0.01	9.800 [a] ± 0.02	92.85 [a] ± 1.47	86.50[b]± 3.72	83.33[b]± 0.73	79.10[b]± 1.60
BHT		0.121 [a] ± 0.11	0.299 [a] ± 0.10	0.399 [a] ± 0.12	0.511[b]± 0.14	3.433 [a] ± 0.01	5.067 [b] ± 0.01	6.633[c]± 0.03	8.533[e]± 0.03	93.06 [a] ± 0.73	90.73 [a] ± 1.68	87.77 [a] ± 1.83	85.02 [a] ± 1.10
BHA		0.224 [a] ± 0.11	0.305 [a] ± 0.08	0.405[a]± 0.09	0.505[b]± 0.10	4.500 [a] ± 0.32	5.100 [b] ± 0.00	6.633[c]± 0.03	8.533[e]± 0.03	93.06 [a] ± 0.73	90.52 [a] ± 2.04	87.98 [a] ± 1.47	85.24 [a] ± 0.73
BPE (1200)PPM		0.218 [a] ± 0.12	0.305 [a] ± 0.11	0.418 [a] ± 0.11	0.524[b]± 0.10	3.533 [a] ± 0.03	5.233[b]± 0.01	7.033[b]± 0.01	8.967[c]± 0.01	92.64 [a] ± 2.54	89.89 [a] ± 2.04	86.93 [a] ± 1.10	84.18 [a] ± 0.37
OPE (1200)PPM		0.212 [a] ± 0.09	0.299 [a] ± 0.11	0.411 [a] ± 0.11	0.517 [b] ± 0.12	3.567 [a] ± 0.01	5.133[b]± 0.02	6.800[c]± 0.03	8.800[d]± 0.05	93.27 [a] ± 0.63	90.31 [a] ± 1.32	87.35 [a] ± 1.60	84.81 [a] ± 0.73
MPE (1200)PPM		0.218 [a] ± 0.12	0.312 [a] ± 0.10	0.362 [a] ± 0.03	0.530 [b] ± 0.09	3.433 [a] ± 0.01	5.167 [b] ± 0.04	6.833[c]± 0.02	9.200[b]± 0.11	92.637[a]± 0.63	90.10 [a] ± 1.68	87.14 [a] ± 1.32	84.39 [a] ± 0.63
LSD		0.205	0.182	0.173	0.100	1.268	0.188	0.201	0.017	2.35	3.95	2.47	1.68

Values are means of three replicates ± stander deviation. LSD: Least significant differences. Data were analyzed by ANOVA (Single factor P ≤ 0.05) (BHA): butylatedhydroxyanisole (BHT): butylatedhydroxytoluene (BP) : Banana peel (OP) : Orange peel (MP) : Mango peel

CONCLUSION

It could be concluded that addition of banana, orange and mango peel extracts to soybean and olive oils improved their qualities during storage period. These extracts can be used as natural antioxidants to retard the oxidative deterioration of oils.

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دراسة مقارنة بين مضادات الأكسدة الصناعية والطبيعية لمستخلصات قشور الموز والمانجو والبرتقال وتأثيرها على زيت فول الصويا وزيت الزيتون

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اجريت هذه الدراسة لتقدير المركبات الفينولية والفلافونات لمستخلص قشور الموز والمانجو والبرتقال وأثرهذه المركبات على بعض الخواص الكيميائية لزيت فول الصويا وزيت الزيتون خلال فترة التخزين. فى هذه الدراسة تم تقدير محتوى الفينولات والفلافونات بواسطة جهاز التحليل الكروماتوجرافى السائل عالى الكفاءة بأستخدام الـ UV detector (كاشف الاشعة الفوق بنفسجية) على طول موجى ٣٨٠ نانو متر و ٣٣٠ نانو متر على التوالى. وتم تخزين زيت فول الصويا وزيت الزيتون لمدة ٦ أشهر على درجة حرارة الغرفة ٢٠±٢ درجة مئوية بعد اضافة ١٢٠٠ جزء فى المليون من مستخلصات قشور الموز والمانجو والبرتقال ومقارنتها بأضافه ٢٠٠ جزء فى المليون من المواد المضادة للأكسدة الصناعية (بيوتيلاتد هيدروكسى تولوين) و (بيوتيلاتد هيدروكسى أنيزول) , وقد تم تحليل عينات الزيوت لقيم رقم الحموضة و رقم البيروكسيد والرقم اليودى كل شهر خلال فترة التخزين , وبينت النتائج أنه فى نهاية فترة التخزين كان رقم الحموضه ورقم البيروكسيد لزيت فول الصويا وزيت الزيتون المعامل بـ ١٢٠٠ جزء فى المليون من مستخلصات قشور الموز والمانجو والبرتقال أقل من باقى المعاملات , بينما كانت قيمة الرقم اليودى أعلى من باقى المعاملات. واستنتج من الدراسة أن إضافة مستخلصات قشور الموز والمانجو والبرتقال للزيوت تحت الدراسة أدى الى تحسين رقم الحموضة والبيروكسيد والرقم اليودى لهذه الزيوت فى نهاية فترة التخزين.لذلك توصى هذه الدراسة بأستخدام مضادات الاكسدة الطبيعية (مستخلصات قشور الفاكهة محل الدراسة) بدلا من الصناعية لاطالة فترة صلاحية الزيوت النباتية للاستخدام نظرا لاحتوائها على نسبة عالية من مضادات الاكسدة الهامة لتحسين الصحة العامة للانسان, ومن جهة اخرى لاحتواء مضادات الاكسدة الصناعية على مواد مسرطنة وضارة بالصحة العامة للانسان.