Virgin Olive Oil Quality: Relationship Between Bioactive Components and Organoleptic Evaluation

Amany, M. M. Basuny, Arafat, M. S. & Dalia, M. M. Mostfa.
Fats & Oils Dept. Food Tech. Res. Inst., Agric. Res. Centre, Giza, Egypt.

ABSTRACT

Extra virgin olive oils were extracted from olive varieties (*Koronakii*, *Picual*, *Arbiquene*, *Coratina* and *Forntoi*) in the presence and in the absence of the stones. Quality characteristics (free fatty acid contents, peroxide value, oxidative stability, organoleptic tests and spectrophotometric indices K232nm and K270nm) were evaluated. Bioactive components of extra virgin olive oil samples, namely, polyphenol, orthodiphenol, bitter index, α-tocopherol, chlorophyll and carotenoid were determined. Fatty acids composition, sterols and phenolic compounds were analyzed by gas liquid chromatography (GLC) and high performance liquid chromatography (HPLC). De-stoning lowered slightly the α-tocopherol content in the extra virgin olive oils but increased the total polyphenols, orthodiphenols, bitter index and pigment content. Oils extracted from de-stoning olive varieties showed higher concentration of hydroxytyrosol and tyrosol phenolic compounds. De-stoning was found to improve the organoleptic properties of the extracted oils.

Key words: Olive oil, De-stoned olive, bioactive components of olive oil, organoleptic tests.

INTRODUCTION

Virgin olive oil, extracted from the fruits of the olive tree, *Olea europea* L., is consumed without further refining to retain volatiles and other minor compounds that produce a fragrant and delicate flavor (Morales & Aparicio, 1999). Olive oil is extracted by pressure or centrifugation systems, which vary not only in the physical forces employed to separate the oil phase, but also in the amount of water used. A pressure system does not require addition of water to the olive paste. However, when the olives are difficult to process and the oily phase is not easily separated from other phases, or when ripe olives are processed, it is necessary to add water to the oily must in the separation stage before it enters a vertical centrifuge (Salvador *et al.*, 1998). Centrifugation systems are the most common procedure since large amounts of olives have to be processed in a short time. There are two centrifugation system, duple-phase and triple-phase decanters (Gandual-Rojas *et al.*, 2000).

One of the primary causes of loss of olive oil quality is oxidation (Frankel, 1985). Because of their role in oil stability there is a special interest in the concentrations of antioxidant compounds, like polyphenols in virgin olive oil (Papadopoulus & Boskow 1991, Montedoro *et al.*, 1992, Baldioli *et al.*, 1996). A relationship between polyphenol content and oxidation stability has been reported for virgin olive oil (DiGiovacchino *et al.*, 1994, Basuny & Mostafa, 2004). The tocopherols in virgin olive oil are important for their nutritional qualities and for their antioxidant properties in that they protect the fat components from autoxidation (Blekas *et al.*, 1995). The most effective is α-tocopherol, followed by β and γ tocopherols, their antioxidant properties in foods have been known for many years (Karmal-Eldin & Appelquist, 1996), but little is yet known about their contribution to the stability of olive oil.

Several authors have found a strong relationship between sensory attributes and the content of phenolic compounds of the olive oil (Mateos *et al.*, 2004). Gutierrez *et al.* (1992) proposed the use of absorbance at wave length 225 nm of the phenolic extract obtained from virgin olive oil for evaluation of bitter taste, since a good relationship with bitterness evaluated by an analytical panel was found.

Olive variety, ripeness and the oil extraction process, which have a major impact on the organoleptic properties of the oil, particularly on oil colour (Melgosa *et al.*, 2005), are among the many characteristics influencing the quality of virgin olive. Olive de-stoning before extraction and milling of pulp have been recently set up, showing good oil yield. Interest in this technology is increasing, and some producers believe that oils obtained from Destoned olives are of better quality than oils extracted from the whole fruit (Baccioni, 2001, Lavelli & Bondesan, 2005, Ranalli *et al.*, 2007).

The aim of the present work is to evaluate the effect of destoning on some indices of olive oil quality, namely, free fatty acid contents, peroxide value, spectrophotometric indices (at wave length of 232nm and 270nm), oxidative stability , organoleptic evaluation and bioactive components (total polyphenols , orthodiphenols,α -tocopherol, chlorophyll, carotenoids).

MATERIALS AND METHODS

Oil samples

Fruits of five olive varieties (*Kronakii*, *Picual*, *Arbiquene*, *Carotenia* and *Frontoi*) were obtained from a private farm at El-Mansouria, Giza Governorate during season 2006. For each variety, a homogenous sample of fruits was selected (5Kg). Only healthy fruits, without any kind of infection or physical damage fruits were harvested at the middle of November. For each olive sample, the fruits were separated into two groups, one of which was De-stoned by hand using a knife. Olive oil was produced from whole fruit and De-stoned olives using a laboratory-scale oil mill.

Solvent, Reagents and Standards

All solvents were distilled before use, Folin Ciocalteau reagent was obtained from Gerbsaure Chemical Co.Ltd. Germany and standard phenolic compouneds (tyrosol, hydroxytyrosol, vanillic, ferulic, cinamic, caffic, elagic, p-coumaric, p-hydroxybenzoic, apigenin and quercetin) were obtained from Koch-light Laboratories Ltd. Colubrook, Buckingham, Shira, England.

Analytical methods

Determination of the free fatty acid contents (% oleic acid), peroxide value (meq O_2/kg oil), and UV absorption characteristics (at wave lengths of 232nm and 270nm) were carried out following the analytical methods described in International Olive Oil Council "IOOC" (1998)..

Fatty acid composition

Preparation of fatty acid methyl-esters

The methyl esters of fatty acids were prepared using (benzene/ methanol/ concentrated sulphuric acid 86:10:4) and the methylation process was carried out for one hour at 80-90°C according to Stahl (1967).

Identification of the fatty acid methyl-esters by GLC

A Pye Unicam PU45550 GLC equipped with dual flame ionization detector was used. The fractionation of fatty acid methyl-esters was conducted using a coiled glass column (1.5mm × 4mm) packed with diatomite (100-120 mesh) and coated with 10% polyethylene glycol adipate. The oven temperature was programmed at 8°C/min from 70°C to 190°C then isothermally at 190°C for 10 min.with nitrogen gas at flow rate of 30 ml/min as a carrier gas, the flow rates for hydrogen and air were 30 ml/min and 320ml/min respectively. Detector and injector temperature were 300°C and 250°C respectively. The chromatogram of the authentic fatty acids used to characterize the unknown fatty acids according to their retention times. Present normalization of each fatty acid was calculated by the normalization with response factor method using the PU 4810 competing integration (Philips). The fatty acid composition was expressed as percentage of total fatty acid (Farag *et al.*, 1984)

Sterol composition

Sterol composition of the virgin olive oil samples were determined according to Modert (1968) using gas liquid chromatography. The sterol was analyzed using Hewlett Packard gas chromatography model 5890 equipped with flame ionization detector. The column used for separating the sterols was a 25mm × 2mm I.D fused silica capillary column coated with dimethyl silicon fluid. The chromatographic condition were: sample size 1µ, nitrogen gas as carrier, injection at temperature 250°C/min then isothermally for 20 min. at 280°C, detector temperature 300°C auxiliary (detector make-up)gas flow rate nitrogen at 20ml/min, hydrogen and air flow rates were 30 ml/min and 400ml/min, respectively. Peak areas measurements, relative percentage of each peak and retention times were determined using a Hewlett Packard 3392 integrator.

Organoleptic evaluation

The organoleptic evaluation was determined for the extracted oils according to the IOOC (1998). The oil samples (15ml each) were presented in covered blue glasses (diameter, 70mm, capacity, 130ml) at 28°C±2°C. The glass warmed and after removing the cover, the sample was smelled and then tested by the panelist to judge its flavour. The different attributes of the oils were assessed and

their intensities were evaluated, as a mean value of the panelists score.

Rancimat method

Rancimat method was used to evaluate oxidative stability, because it is fast and reliable (Gutierrez, 1989). Stability was expressed as the oxidation induction time (hr) measured with the Rancimat 679 apparatus (Metrohm Co., Switzerland) using an oil sample of 5.0g warmed to 100°C, and an air flow of 20L/hr. The time taken to reach a fixed level of conductivity was measured.

Phenol compounds

Phenol compounds were isolated by triple extraction of a solution of oil in hexane with a water/methanol mixture (60:40). The folin-Ciocalteau reagent was added to a suitable aliquot of the combined extracts and the absorption of the solution at wave length of 725nm was measured. Ortho-diphenols were measured calorimetrically at wave length of 370nm after adding 5% (W/V) sodium molybdate in 50% ethanol. Values obtained are expressed as mg of caffeic acid per kilogram of oil (Gutfinger, 1981).

Pigment content

Chlorophyll and carotenoid compounds (mg/Kg) were determined at wave length of 670nm and 472nm, respectively, in cyclohexane using the specific extinction values, by the method of Minguez-Mosquera *et al.*, (1991).

Bitter index:

Bitter index was evaluated by extraction of the bitter components from the olive oil samples. One gram +0.01g oil sample was dissolved in 4 ml hexane and passed through C18 column (Sep-Pack Cartridges, Water, Milford, MA), previously activated with methanol and washed with hexane (6ml). After, 10 ml of hexane was passed through to eliminate fat, and then the retained compounds were with methanol/water (1:1) to 25ml (Gutierrez *et al.*, 1992). The absorbance of the extract was measured at 225 nm against methanol / water (1:1) in a 1 cm cuvette.

Phenolic fraction

Phenolic fraction was isolated by solid phase extraction and analyzed by reversed-phase HPLC using a diode array UVdetector (Mateos *et al.*, 2001). A Hewlett-Packard series 1,100 liquid chromatographic system(Waldbronn, Germany) equipped with a diode array detector and a lichrosorb RP 18 column (4.0 mmid C 250 mm, particle size 5mm, Merck, Darmstadt) was used. Elution was performed at a flow rate of 1.0 ml/min with mobil phase of water/acetic acid (98:2 v/v, solvent A) and methanol/acetonitril (50:50,v/v, solvent B), starting with 5% B then increased to levels of 30% at 25min., 40% at 35min., 52% at 40min., 70% at 50min., 100% at 55min., and kept at this stage for 5min. Quantification of phenolic compounds was carried out at wave length of 280 nm using P-hydroxybenzoic acid as an internal standard.

Statistical analysis

Analysis of variance (ANOVA) was carried out on all data. A 5% level of least significant difference (LSD), calculated by Duncan's multiple range test, was used to establish differences between the mean values, when ANOVA detected a significant ($P \geq 0.05$) (Snedecor & Cochran,1973).

The correlations between bioactive components and parameters with stability were calculated from the following equation: stability/parameters.

RESULTS AND DISCUSSION

The quality parameters of extra virgin olive oil were evaluated by free fatty acid, peroxide value and the spectrophotometric indices (at wave length of 232nm and 270nm and the data are reported in Table (1). It was found that the extra virgin olive oils obtained from the five varieties (*Kronakii*, *Picual*, *Arbiquene*, *Carotenia*, and *Frontoi*), the quality parameters studied were not significantly ($P>0.05$) affected by the presence or absence of the stones during extraction. For all virgin olive oil samples free fatty acid, peroxide value, absorbance at 232nm and 270nm were markedly below the limits fixed by the IOOC for olive oil to be labeled as "extra virgin".

The results in Table (1) also show the effect of de-stoning on the organoleptic tests of extra virgin olive oils obtained from the five varieties (*Kronakii*, *Picual*, *Arbiquene*, *Carotenia*, and *Frontoi*).

Oils extracted from de-stoned fruits were more fragrant with respect to the oils extracted from whole fruits and had a delicate, delicious and harmonic aroma and flavour. Their positive sensory notes were liked and scored high by the panelists. They had less marked bitter, sharp and astringent

notes (data not shown). Thus, oil extracted from whole fruits may not or little be liked by some consumers. They, frequently, also may have a lightly woody taste (Saitta *et al.*, 2003).

Data in Table (2) show the changes in the fatty acid and sterol composition of the extra virgin olive oils obtained from the whole and de-stoned olives. De-stoning did not cause any significantly differences between all varieties. While, absence of the stones during extraction led to significant increase in the β-sitosterol of extra virgin olive oil samples obtained from all varieties.

The bioactive components of extra virgin olive oil are result of a number of variables acting before extraction (such as olive variety, environmental, climatic, soil and cultivation condition, olive ripeness, and olive healthy) and during extra virgin olive oil extraction and storage (Velasco & Dobarganes, 2002). As shown in Table (3), the phenolic contents, orthdiphenols and bitter index of extra virgin olive oil were affected by olive varity and de-stoning. De-stoning caused an increase in the phenolic contents, orthodiphenols and bitter index of all extra virgin olive oil extracted from all varieties. As a result, among extra virgin olive oils extracted from de-stoned fruits *Kronakii* had the highest phenolic contents, orthodiphenol, and bitter index.

The main tocopherol compound in extra virgin olive oils is α – tocopherol. As shown in Table (3), the α-tocopherol content of extra virgin olive oil was affected by both olive variety and de-stoning. With respect to olive variety, extra virgin olive oil extracted from olives of *Kronaki* variety had the highest α-tocopherol content in the presence of stone. In general, de-stoning lowered the α-tocopherol in all extra virgin olive oil, this in agreement with results that reported by Frega *et al.*, (2005).

The composition and the total natural pigment content of oils are important quality parameters because they correlate with colour, which is a basic attribute for evaluating olive oil quality. Pigments are also involved in autoxidation and photo-oxidation mechanisms (Minguez-Mmosquera *et al.*, 1990). Chlorophylls and carotenoids in all varieties oil ranged from 20.30 to 38.00 ppm and from 11.50 to 19.70 ppm, respectively (Table 3). The oil extracted from de-stoned fruits had higher contents of chlorophyll and carotenoids.

The effect of de-stoning on oxidative stability of extra virgin olive oil was measured by Rancimat method at 100°C±2°C. As shown in Table (4), the oxidative stability of extra virgin olive oil increased in oils extracted from de-stoned fruits with respect to oils extracted from the whole fruits. The high resistance to oxidation of the extra virgin olive oil from de-stoned olives may be attributed to its high polyphenols, orthodiphenols and α -tocopherols content which are considered natural antioxidants (Ranalli *et al.*, 2007).

Identification of phenolic compounds by HPLC technique was used to identify the major phenolic compounds in the virgin olive oil samples extracted from olive varities (*Koronakii*, *Picual*, *Arbiquene*, *Carotenia*, and *Forntoi*).The identification was based on comparisons of the chromatographic retention time and UV absorbance spectra of compounds in olive oil samples with those of authentic standards. Data of the HPLC analysis of the olive oil samples are given in Table (5). Data show that the phenolic compounds of olive oil samples were made up of 12 compounds. De-stoning caused an increase in the main phenolic compounds (tyrosol, hydroxytyrosol and p-hydroxybenzenoic acid) of all extra virgin olive oils extracted from all varieties.

In general data reported in Table (5) show that the effect of de-stoning on phenolic compounds concentration was different according to the variety. These results are in agreement with the data reported in the literature (Baccioni, 2001, Frega *et al.*, 2005).

Finally, correlation between stability and the bioactive components and quality indices considered in this study are shown in Table (6). Statistical analysis of data indicated that the compounds most related to oxidative stability were the phenolic compounds and pigments. The under went the most appreciable alterations during the induction period, or the slow phase of oxidation. Because tocopherols and orthodiphenols were the first compounds to be degraded, we could suggest that their measurement is a useful way to establish the average life of oils subjected to oxidation

The extraction of extra virgin olive oil from de-stoned olive varieties as described in this paper could be good facilities that guarantee a production of an oil of distinctly high quality.

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Parameters	*Koronakii*		*Picual*		*Arbiquene*		*Carotenia*		*Frantoi*		LSD value at P>0.05
	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	
Free fatty acid (oleic acid %)	0.12[a]	0.07[b]	0.13[a]	0.08[b]	0.11[a]	0.06[b]	0.14[a]	0.08[b]	0.10[a]	0.07[b]	0.02
Peroxide value(meq.O_2\Kg oil)	0.90[a]	0.60[b]	0.81[a]	0.53[b]	0.85[a]	0.51[b]	0.79[a]	0.50[b]	0.81[a]	0.61[b]	0.10
Absorbance at 232nm	0.10[a]	0.07[b]	0.10[a]	0.06[b]	0.11[a]	0.07[b]	0.10[a]	0.05[b]	0.11[a]	0.06[b]	0.01
Absorbance at 270nm	0.05[a]	0.02[b]	0.05[a]	0.03[b]	0.06[a]	0.02[b]	0.07[a]	0.03[b]	o.06[a]	0.02[b]	0.01
Sensory evaluation	7.00[a]	7.7[b]	7.1[a]	7.8[b]	7.8[a]	8.30[b]	7.30[a]	7.90[b]	7.00[a]	7.90[b]	0.10

Values in each row followed by the same letter are not significantly different at P≥0.05.

Table 2: Fatty acid and sterol compositions of virgin olive oil samples

Parameters (%)	*Koronakii*		*Picual*		*Arbiquene*		*Carotenia*		*Frantoi*		LSD value at P>0.05
	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	
Fatty acids:											
C16:0	15.60a	16.00b	12.00a	12.60b	14.00a	15.10b	16.50a	16.30b	14.30a	14.90b	0.3
C16:1	1.20a	1.10a	0.90a	1.00a	1.50a	2.60a	2.00a	2.20b	1.90a	2.00a	0.1
C18:0	1.90a	2.00a	2.30a	2.50b	1.70a	1.55b	2.10a	1.90b	1.50a	1.20b	0.1
C18:1	70.30a	71.2a	75.50a	76.00b	72.80a	73.10b	71.00a	72.30b	73.00a	74.10b	0.2
C18:2	2.70a	2.80a	3.50a	3.60a	9.30a	8.00b	5.30a	4.32b	3.10a	2.90b	0.1
C18:3	0.30a	0.20a	0.81a	0.92b	0.50a	0.31b	0.20a	0.19a	0.21a	0.23b	0.1
C20:0	0.21a	0.20a	0.30a	0.43b	0.30a	0.22b	0.31a	0.29a	0.35a	0.30b	0.05
Sterols:											
β-sitosterol	93.20a	95.10b	92.30a	94.20b	93.01a	95.13b	91.06a	94.13b	93.15a	95.16b	1
Stigmasterol	5.30a	3.02b	6.00a	3.05b	5.00a	4.01b	5.12a	3.19b	6.11a	4.50b	0.83
campasterol	1.50a	1.88a	1.40a	3.13b	1.44a	1.00b	1.03a	1.30a	1.50a	1.20a	0.4

Values in each row followed by the same letter are not significantly different P≥0.05.

Table 3: Bioactive components of virgin olive oil samples

Parameters (%)	*Koronakii*		*Picual*		*Arbiquene*		*Carotenia*		*Frantoi*		LSD value at p>0.05
	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	
Total polyphenols (as caffeic acid)	195.00a	210.00b	170.00a	183.50b	151.20a	159.30b	190.30a	207.00b	161.00a	170.90b	3.50
Orthodiphenols	25.10a	39.40b	18.90a	25.30b	17.30a	23.11b	30.11a	35.50b	15.50a	19.40b	5.20
α-tocopherol	311.50b	290.00a	290.30b	261.20a	260.50b	253.00a	308.00b	292.00a	270.00b	255.30a	4.90
Chlorophyll(as pheophytin)	30.80a	37.50b	23.14a	28.90b	20.30a	24.50b	30.90a	38.00b	22.11a	29.11b	5.50
Carotenoid(as leutin)	15.30a	19.70b	13.20a	16.30b	11.50a	14.30b	14.70a	18.80b	13.15a	16.90b	3.20
Bitter index at 225nm	5.50a	7.30b	4.50a	6.70b	4.00a	5.90b	5.30a	7.30a	4.60a	5.90b	1.00

Values in each row followed by the same letter are not significantly different at P≥0.05.

Table 4: Oxidative stability of virgin olive oil samples

Olive	Oxidative stability (hr)
Whole fruit:	
Koronakii	36.00a
Picual	32.50a
Arbiquene	29.30a
Carotenia	29.90a
Frantoi	25.50a
De-stoned fruits	
Koronakii	38.30b
Picual	34.50b
Abiquene	31.30b
Carotenia	32.00b
Frantoi	28.30b
LSD value at P>0.05 = 1.00	

Table 5: Phenolic compounds of virgin olive oil samples

Parameters (%)	*Koronakii*		*Picual*		*Arbiquene*		*Carotenia*		*Frantoi*		LSD value at P>0.05
	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	
Tyrosol	20.32[a]	23.50[b]	19.00[a]	23.09[b]	19.03[a]	22.50[b]	20.00[a]	23.00[b]	17.00[a]	19.50[b]	1.00
Hydroxytyrosol	32.13[a]	36.11[b]	28.30[a]	30.50[b]	27.50[a]	29.13[b]	26.50[a]	29.00[b]	25.15[a]	27.50[b]	0.95
Vanillic acid	5.30[a]	2.82[b]	7.00[a]	3.50[b]	3.30[a]	3.13[b]	6.15[a]	3.12[b]	5.86[a]	5.15[b]	0.20
Ferulic acid	3.05[a]	1.05[b]	3.19[a]	1.20[b]	-	0.05[b]	2.09[a]	0.10[b]	3.00[a]	4.15[b]	0.30
Cinamic acid	2.05[a]	1.90[b]	2.20[a]	3.21[b]	4.50[a]	4.90[b]	6.20[a]	6.13[b]	2.01[a]	2.13[a]	0.30
Caffeic acid	4.11[a]	5.11[b]	4.75[a]	3.05[b]	2.00[a]	4.55[b]	6.00[a]	5.01[b]	4.09[a]	5.05[b]	0.40
Elagic acid	3.02[a]	2.02[b]	4.05[a]	4.50[b]	-	-	3.10[a]	5.23[b]	4.00[a]	5.01[b]	0.50
p-coumaric acid	3.18[a]	2.14[b]	2.61[a]	4.50[b]	3.15[a]	5.00[b]	1.00[a]	0.07[a]	5.19[a]	1.50[b]	0.30
p-hydroxybenzoic	19.02[a]	22.15[b]	17.00[a]	19.05[b]	17.12[a]	19.50[b]	16.50[a]	18.70[b]	20.01[a]	22.05[b]	0.70
Chlorogenic acid	5.50[a]	1.90[b]	6.40[a]	4.03[b]	5.09[a]	4.11[b]	5.18[a]	4.50[b]	7.19[a]	7.00[a]	0.30
Apigenin	2.30[a]	1.30[b]	4.55[a]	4.49[b]	6.19[a]	7.12[b]	6.28[a]	5.14[b]	6.50[a]	0.96[b]	0.20
Quercetin	0.02[a]	-	0.05[a]	0.01[b]	0.02[a]	0.01[a]	-	-	-	-	0.01

Values in each row followed by the same letter are not significantly different atP≥0.05.

Table 6: Correlations between bioactive components and certain parameters with stability

Stability/Parameters	*Kronakii*		*Picual*		*Arbiquene*		*Carotenia*		*Frantoi*		LSD value at P>0.05
	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	Whole fruit	De-stoned	
peroxide value	40.00	63.83	40.12	65.09	34.47	61.37	37.85	64.00	31.48	46.39	1.00
Absorbance at 232	360.00	547.14	325.00	575.00	266.36	447.14	299.00	640.00	231.81	471.66	0.95
Absorbance at 270	720.00	1415.00	650.00	1150.00	488.33	1565.00	427.14	1066.66	425.00	1415.00	0.20
Polyphenols	0.18	0.19	0.19	0.20	0.19	0.20	0.15	0.16	0.16	0.17	0.30
Ortho-diphenols	1.43	0.97	1.72	1.36	1.69	1.35	0.99	0.90	1.60	1.46	0.30
Tocopherol	0.12	0.13	0.12	0.14	0.11	0.13	0.10	0.11	0.09	0.10	0.40
Carotenoids	2.35	1.90	2.46	2.12	2.55	2.20	2.03	1.70	1.93	1.67	0.50
Chlorophylls	1.17	1.02	1.40	1.19	1.45	1.29	0.96	0.84	1.15	0.97	0.30
Organoleptic	5.14	4.97	4.60	4.42	3.75	3.80	4.09	4.05	3.64	3.58	0.70

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جودة زيت الزيتون البكر: العلاقة بين المركبات الحيوية والخواص الحسية

أماني محمد محمد بسيوني، شاكر محمد عرفات، دليا محمود محمد مصطفي

قسم بحوث الزيوت والدهون، معهد بحوث تكنولوجيا الاغذية، جيزة، مصر.

تم استخلاص عينات زيت الزيتون البكر من خمسة أصناف من ثمار الزيتون و هى (الكروناكى والبيكوال والأربيكوين و الكرواتينا و الفرانتيو) وذلك فى وجود النواة الحجرية وفى غيابها. تم دراسة خصائص الجودة (الاحماض الدهنية الحرة ورقم البيروكسيد و الثبات التأكسدي والخواص الحسية والامتصاص فى منطقة الأشعة فوق البنفسجية على طول موجى ٢٣٢ و ٢٧٠ نانوميتر) لعينات زيت الزيتون المستخلصة.

أيضا تم تقدير المركبات الحيوية (المركبات الفينولية الكلية و الأرثوثنائى فينول ودليل المرارة والفاتوكوفيرول والكلوروفيل والكاروتينويد). تم التعرف على الأحماض الدهنية والأستيرولات والمركبات الفينولية بواسطة جهازى التحليل الكروماتوجرافى الغازى والسائل فائق الإظهار فى كل عينات زيت الزيتون موضع الدراسة.

أشارت النتائج المتحصل عليها إلى أن عملية نزع البذور من ثمار الزيتون قبل استخلاص الزيت يؤدى إلى انخفاض بسيط فى محتوى الألفا توكوفيرول في حين أدى ذلك إلى زيادة محتوي الفينولات الكلية والأرثوثنائى فينول ودليل المرارة ومحتوي الصبغات (الكلوروفيل – الكاروتين) ولقد تبين أيضاً أن عملية نزع البذور من كل أصناف الزيتون تحت الدراسة قد أدت إلى ارتفاع تركيز مركبي التيروزول والهيدروكسي تيرزول فى الزيت المستخلص. كما أن نزع البذور قد أدي إلى تحسين الخواص الحسية للزيت المستخلص.