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CORRELATIONS BETWEEN SOME CHEMICAL AND SENSORY PARAMETERS OF JORDANIAN RUMI AND NABALI OLIVE OIL SAMPLES OBTAINED AT DIFFERENT HARVESTING DATES

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ABSTRACT

Twenty four olive oil samples were obtained from Bani-Kanana district, of two main local olive varieties (Nabali and Rumi) at four harvesting dates in 2009. The effect of the variety and olive harvesting dates, on several sensory, physicochemical and chemical characters, were studied as an attempt to understand the relationships between sensory and chemical properties of Rumi and Nabali olive oils. Sensory data were assisted by trained panels for olive oil evaluation. Several characteristics (acidity, peroxide value, extinction coefficients at 232nm and 270nm, tochopherols, and total phenols) were studied. The organoleptic assessment of olive oil for its quality classification was not satisfactory and it is preferred to be done parallel with acidity determination.

The positive attributes (fruity, bitter and pungent) were significantly increased in Nabali olive oil toward the proper harvesting date; this improvement was parallel to the increase in the total phenol. Such a significant change was not observed in Rumi variety.

The intensity of rancid attribute in Rumi olive oil was significantly higher than that in Nabali oil at all harvesting dates with no correlation with the tested oxidation parameters (rancid attribute).

The trained panel could not detect any increase in intensity of rancid attribute with progressive harvesting date, though peroxide values, OD 232 nm and OD 270 nm in both Rumi and Nabali olive oil were significantly increased. Significantly higher levels of fusty and musty attributes were traced in Rumi olive oil rather than in Nabali olive oil. These findings were correlated with the acidity values.

The peroxide and OD 232 nm values of Rumi and Nabali olive oils were significantly increased throughout the harvesting period. The total phenol content in olive oil was significantly increased until the optimal harvesting date then significantly decreased for both olive varieties. Tochopherol content decreased significantly after the optimum harvesting date in Rumi but not in Nabali olive oil.

Key words: *chemical attribute, harvesting date, olive oil, olive variety, sensory attribute.*

1. INTRODUCTION

Olive oil, is one of the important components in the diet of Mediterranean people, obtained by mechanical extraction from the fruit of the *Olea europaea* L. tree, which belongs to the Olive family, comprised 400 species and thrives in temperate and tropical climates (Marriee *et al*., 1996).

The composition and quality of virgin olive oil might be greatly influenced by many factors including olive variety, environmental conditions, stage of ripening, sanitary state of drupes, storage conditions and extraction technology (Stefanoudaki *et al.,* 2000; and Aparicio and Luna, 2002). Olive oil characteristics might vary according to the environmental factors (Amr, and Abu-Al-Rub, 1993). Oils of high quality could be obtained from fresh olives (Ryan, *et al.,* 1999). Sensory evaluation of olive oil following scientific and standardized methods had gained paramount significance in grading virgin olive oil (IOOC, 1996).

Since few years, much attention has been observed on the olive and olive oil sector regarding the quantity and quality of the obtained oil. Different varieties were cultivated in different locations in Jordan that differ in the rain fall and climate (Jordan valley, Ajloun, etc). These might produce oils with different chemical and sensory properties (Al-Juneidi, 2005).

In Jordan, despite the increase in olive oil production, which reached about 29 thousand MT in 2004 (MoA, 2004), there is lack of studies regarding the effect of harvesting dates for different varieties even the most popular olive varieties (Rumi and Nabali), and the sensory properties of olive oil obtained. The aims of this study were directed to characterize the sensory and chemical characteristics of olive oil pressed from the two varieties at four harvesting dates. The same conditions were applied for the year of harvest, environmental conditions and same extraction technology, as an attempt to understand the correlations between some chemical and sensory parameters of olive oil pressed from the two varieties under study. The study also focused on identifying the influence of olive varieties and different harvesting dates on the total phenols and tocopherols contents as well as the oxidation indicators in the obtained oils.

2. MATERIALS AND METHODS

A maturation (harvest) index, based on the color of the fruit was proposed by International Olive Oil Council (IOOC, 1984). One hundred olive fruits were randomly taken from one kilogram of sample and the maturation index was determined using the following formula:

Maturation Index = (0 x N0) + (1 x N1) + (2 x N2) + ….. (7 x N7)/ 100 Where, N0, N1, N2… N7 are the number of olives which are categorized according to their epidermis color as follows : 0 – olives with intense green or dark green epidermis; 1 – olives with yellow or yellowish green epidermis; 2 – olives with yellowish epidermis but with reddish spots or areas over less than half of the fruit; 3 – olives with reddish or light violet epidermis over more than half of the fruit; 4 – olives with black epidermis and totally white pulp; 5 – olives with black epidermis and less than 50% purple pulp; 6 – olives with black epidermis and violet (more than 50%) or purple pulp; 7 – olives with black epidermis and totally dark pulp.

The study included from 24 virgin olive oil samples obtained from 2009 crop harvesting year, from Bani-Kanana district (North of Jordan), a plain location in term of altitude. Samples were taken from three different farms at four harvesting dates, *i.e.* 1/11, 15/11, 1/12, 15/12, and harvested by hand. A careful selection of healthy fruits was made and olives infected by insects were discarded. At the harvesting dates, the olive sample of each variety (450-500Kg) was collected from about 150 trees from each farm. The number of olive samples at the harvesting dates was 6 (3 Nabali and 3 Rumi) and 24 samples at the last harvesting stage (3 samples per harvesting date x 2 varieties x 4 dates). Olives were pressed within 5 days at cold conditions in the same commercial press for all samples; malaxation temperature was 28 ± 2°C. Olive oil samples were filled in 16 kg coated tin container. A portion of the sample was stored at freezing conditions until analyzed within 5 days for acidity, peroxide value and absorption coefficients OD 232nm and OD 270nm and total phenols. Another portion of the sample was stored at freezing conditions until tocopherol analysis within one month. The remaining samples were stored for 2 months in coated tin containers under the freezing conditions for sensory evaluation and remained chemical analysis.

The samples were evaluated according to the International Olive Oil Council (IOOC, 1996) protocol after two months of storage at freezing conditions by Jordanian olive oil tasting team, using the profile sheet for organoleptic assessment of olive oil. The panels evaluated the sensory attributes of olive oil samples, and then marked the intensity for each attribute from 0-10, by comparing each attribute with the standard. The standard attribute was considered as the highest level 10. The panelists evaluated each sample in duplicate and made only one evaluation per session. The panel consisted of 12 trained individuals according to the standard COI/T20/Doc 3 (IOOC, 1996).

Peroxide value and specific absorption coefficients (OD 232 nm and OD 270 nm) were determined according to (AOCS, 1989 and IOOC 1968), while the hydrolytic rancidity was evaluated by determining free fatty acid contents according to AOCS (1989). Polyphenols were analyzed according to the Foline-Ciocalteu procedure (Gutifinger, 1981). Tochopherols were determined according to the method of Bianchia, *et al.,* (2001).

Data from both sensory evaluation and chemical analysis for the two olive varieties were analyzed according to the general linear model procedure of (SAS, 1994). In order to find the effect of harvesting dates and olive varieties, data were analyzed using the analysis of variance (ANOVA) procedure. Duncan's multiple range tests were applied to determine significance between different treatments.

3. RESULTS AND DISCUSSION

The correlations among some parameters of Rumi and Nabali olive samples are shown in Table (1). The intensity of rancid attribute of Rumi olive oil samples was significantly higher ($p < 0.01$) than that of Nabali samples at progressive harvesting dates. The values of the rancid attribute were compared with the values of the parameters that measure the level of olive oil oxidation (OD 232nm, OD 270 nm and PV). It was concluded that the OD 270nm values (which measure the concentration of aldehydes and ketones developed from the oil oxidation), showed similar trend, since the values recorded for Rumi olive oil samples were slightly higher than those of Nabali samples. However, weak correlation (r=0.319, n=24, not significant at $p < 0.05$) (Table 1), was found between the values of OD 270 and that of rancid attributes. This indicates that it is difficult to use only the sensory analysis to judge the quality of olive oil samples.

Acidity, peroxide value, OD 232 nm, OD 270 nm, total phonoles, and tocopherols of Rumi and Nabali olive oil at different harvesting dates are presented in Table (2), The data shows that the highest significant peroxide values in Rumi and Nabali olive oil were found at the fourth harvesting date. The acidity and OD 232 nm were ascendlingly arranged with harvesting dates. While the intensities of rancid attributes in oils (OD 270 nm) obtained from these two olive varieties were increased at the second harvesting date, then decreased at the third harvesting date and did not changed afterwards (fourth date), total phenols and tocopherols showed similar trend as OD 270 nm.

The panel did not detect the increase in the intensity of rancid attribute with the progressive date (Table 3), although the chemical parameters (OD 232nm, OD 270 nm and PV) demonstrated such an increase (Table 2). It was reported that the peroxide values do not give indication about the amount of oxidative rancidity, because it determines the primary oxidation product (hydroperoxides) but not the secondary oxidation products responsible for the rancid flavor, especially if the fat is in the decline stage on peroxide value-time curve (Gray,1978). Fresh oils usually have a peroxide value below 10 mEq O_2/kg, but rancid taste often begins to be noticeable when the peroxide value is between 20 and 40 mEq O_2/kg (Abu-Al-Rub, 1992) indicating that high level of peroxidation decomposition was taken place. Fusty and musty attributes refer to the characteristic flavor of olive oil due to the growth or activity of anaerobic bacteria, fungi or yeasts, which result also in hydrolysis of triglycerides producing free fatty acids and the production of off-flavors. The intensities of these two attributes of the Rumi olive oil samples were significantly higher ($p < 0.01$) than those of the corresponding values of Nablai olive oil samples during the four harvesting periods (Tables 3 and 4).

These results might be confirmed by the free fatty acids content; since it was significantly higher ($p < 0.01$) in Rumi olive oil samples than those of the corresponding Nabali olive oil samples (Tables 3 and 5).

Very weak correlation was found between fusty (r=0.1, n=24, not significant at $p < 0.05$) and musty (r=0.07, n=24, not significant at ($p < 0.05$) and free fatty acids content (Table 1). The changes in intensities of musty and fusty attributes towards the end of the harvesting date were not clear in Rumi olive oil, whereas, these attributes were decreased throughout the ripening progressing until reaching to the third harvesting date (within the proper harvesting date) for Nabali olive oil and remained constant towards the last date. The opposite trend was found for the acidity, since it increased during the ripening progressing in Rumi and Nabali olive oil (Table 2).

The intensity of the fruity attribute was significantly increased ($p < 0.01$) parallel with harvesting time progressing in Nabali olive oil, while the change was not clear in Rumi olive oil (Tables 3 and 6). On the other hand, the panel observed that the fruity attribute in Rumi olive oil was significantly higher ($p < 0.01$) than that in Nabali olive oil, at the first two harvesting dates, and the opposite was observed at the last two harvesting dates (Tables 3 and 4).

Other positive attributes (bitter and pungent) were also significantly increased ($p < 0.01$) parallel with the harvesting date in Nabali olive oil (Tables 3 and 6). Such increase was related to the significant increase ($p < 0.01$) in the total phenols with the progress of the harvesting date until reaching the proper harvesting date (Tables 2 and 5). In Rumi variety, changes in bitter and pungent attributes showed a highly significant at ($p < 0.01$) and insignificant ($p>0.05$) toward the proper harvesting level respectively (Tables 2 and 6).

These findings coincide with the significant increase ($p < 0.01$) in the total phenols in Rumi variety (Tables 2 and 7). However, weak correlation between bitter taste (r=0.23, n=24, not significant at ($p < 0.05$) (Table 1) and total

Table (1): Correlations among some chemical and sensory parameters of Rumi and Nabali olive oil samples obtained at different harvesting dates [a] .

	Acidity	Peroxide value	OD 232 nm	OD 270 nm	Total phenols	Tocopherols	Fruity	Fusty	Musty	Rancid	Bitter
Acidity	1	0.7*	0.76*	0.78*	-0.007	-0.22	0.27	0.09	-0.07	-0.08	0.15
Peroxide value	0.7*	1	0.95*	0.79*	-0.10	-0.68*	0.74*	-0.54	-0.72*	0.71*	0.64*
OD232nm	0.76*	0.95*	1	0.75*	-0.21	-0.68*	0.61	-0.32	-0.55	-0.56	0.54
OD270nm	0.78*	0.79*	0.75*	1	0.35	-0.31	0.71*	-0.14	0.26	0.32	0.52
Total phenols	-0.01	-0.1	-0.21	0.35	1	0.63*	0.31	0.08	0.19	0.4	0.23
Tocopherols	-0.22	-0.7	-0.69*	-0.31	0.63*	1	-0.46	0.46	0.63*	0.89*	0.41
Fruity	0.27	0.7*	0.61	0.71*	0.31	-0.46	1	-0.64	-0.69*	-0.64*	0.95*
Fusty	0.1	-0.5	-0.32	-0.14	0.08	0.46	-0.64*	1	0.95*	0.78*	-0.65*
Musty	0.07	-0.7*	-0.55	-0.26	0.19	0.63*	-0.69*	0.95*	1	0.87*	-0.7*
Rancid	-0.08	-0.7*	-0.56	0.32	0.4	0.89*	-0.64*	0.78*	0.87*	1	-0.57
Bitter	0.15	0.6	0.54	0.52	0.23	-0.4	0.95*	-0.65*	-0.7*	-0.57	1

[a] Values marked with an asterisk are significantly correlated ($p < 0.05$).

Table (2): Acidity, peroxide value, OD 232 nm, OD 270 nm, total phenols and tocopherols of Rumi and Nabali olive oils at different harvesting dates.

Harvesting dates	Acidity (Oleic acid) %	Peroxide value (mEq O_2/kg oil)	OD 232nm	OD 270nm	Total phenols (mg/kg)	Tocopherols (mg/kg)
	Rumi olive oil					
First [1]	0.55d ± 0.06	4.1c ± 0.62	1.44d ± 0.14	0.18a± 0.04	305c ± 5	289ab ± 14.8
Second[2]	0.61c ± 0.08	5.5bc ± 0.81	1.65c ± 0.14	0.18a± 0.04	370a ± 8	306a ± 23.3
Third[3]	0.68b ± 0.09	6.3b ± 0.79	1.97b ± 0.13	0.19a± 0.06	322b ± 12	270b ± 19.0
Fourth[4]	0.80a ± 0.09	8.9a ± 1.04	2.20a ± 0.14	0.19a± 0.04	120d ± 8	241c ± 9.8
	Nabali olive oil					
First [1]	0.44b ± 0.07	4.2b ± 0.70	1.49c ± 0.17	0.17a± 0.04	115d ± 12	252ab ±13.1
Second[2]	0.5ab ± 0.06	5.5 b ± 0.96	1.78bc± .15	0.17a± 0.05	145c ± 12	262a ± 18.0
Third[3]	0.55ab ± 0.06	8.2a ± 0.82	1.93ab±0.16	0.19a± 0.05	372a ± 12	251ab ± 16.1
Fourth[4]	0.66a ± 0.09	9.1a ± 0.66	2.22a ± 0.18	0.19a± 0.03	171b ± 17	226b ± 13.4

Each value is a mean of three replications, followed by the standard deviation. Means with different matching letters within a column and variety are significantly different ($p < 0.05$) according to Duncan's Multiple Range test.

[1] 1/11, 10 and 22 days before the proper harvesting date of Rumi and Nabali olive oil respectively

[2] 15/11, within and 7 days before the proper harvesting date of Rumi and Nabali olive oil respectively

[3] 1/12, after and within the proper harvesting date of Rumi and Nabali olive oil respectively

[4] 15/12 after the proper harvesting date of Rumi and Nabali olive oil

Table (3): Organoleptic properties of Rumi and Nabali olive oils at different harvesting dates.

Harvesting dates	Fruity	Bitter	Pungent	Fusty	Musty	Muddy Sediment	Rancid
Rumi olive oil							
First [1]	**0.9b ± 0.2**	**0.5a ± 0.1**	**0.7b ±0.1**	**2.2b± 0.1**	**1.2 ± 0.3**	**0.0b ± 0.0**	**1.2a ± 0.3**
Second[2]	**0.9b ± 0.1**	**0.6a ± 0.1**	**0.7b ± 0.1**	**1.8c ± 0.1**	**0.8c ± 0.3**	**0.6a ± 0.4**	**1.3a ± 0.3**
Third[3]	**1.1a ± 0.1**	**0.6a ± 0.1**	**0.9a ± 0.1**	**3.7a ± 0.2**	**1.4a ± 0.2**	**0.7a ± 0.4**	**1.3a ± 0.3**
Fourth[4]	**0.9b ± 0.1**	**0.3b ± 0.1**	**0.7b ± 0.1**	**1.6c ± 0.3**	**0.5d ± 0.2**	**0.1b ± 0.1**	**0.5b ± 0.2**
Nabali olive oil							
First [1]	**0.3d ± 0.1**	**0.0d ± 0.0**	**0.1d ± 0.1**	**2.2a ± 0.4**	**0.9a ±0.2**	**0.6a ± 0.3**	**0.6b ± 0.2**
Second[2]	**0.7c ± 0.1**	**0.7c ± 0.1**	**1.5c ± 0.2**	**1.3b ± 0.3**	**0.5b ± 0.1**	**0.0b ± 0.0**	**0.9a ± 0.3**
Third[3]	**2.2b ± 0.4**	**1.3b ± 0.1**	**2.2a ± 0.2**	**0.1d ± 0.1**	**0.0c ± 0.0**	**0.0b ± 0.0**	**0.3c ± 0.2**
Fourth[4]	**2.4a ± 0.1**	**1.8a ± 0.1**	**1.9b ± 0.1**	**0.5c ± 0.1**	**0.0c ± 0.0**	**0.0b ± 0.0**	**0.0c ± 0.0**

Each value is a mean of three replications, followed by the standard deviation. Means with different matching letters within a column and variety are significantly different ($p < 0.05$) according to Duncan's Multiple Range test.

[1] 1/11, 10 and 22 days before the proper harvesting date of Rumi and Nabali olive oil respectively

[2] 15/11, within and 7 days before the proper harvesting date of Rumi and Nabali olive oil respectively

[3] 1/12, after and within the proper harvesting date of Rumi and Nabali olive oil respectively

[4] 15/12 after the proper harvesting date of Rumi and Nabali olive oil

Table (4): ANOVA results of the effect of olive varieties on the studied sensory attributes.

Sensory attribute	d f	M.S	F-value	*Pr > f
Fruity	1	1.1266	49.16	< 0.0001
Bitter	1	1.3066	209.07	< 0.0001
Pungent	1	2.8016	186.78	< 0.0001
Fusty	1	10.010	180.64	< 0.0001
Musty	1	2.3437	75.00	< 0.0001
Muddy-Sediment	1	0.2400	5.33	0.0346
Rancid	1	2.535	47.16	< 0.0001

* (pr > f) ≤ 0.05 significant, (pr > f) ≤ 0.01 highly significant

Table (5): ANOVA results of the effect of olive varieties on the studied chemical variables.

Chemical property	d f	M.S	F-value	*Pr > f
Acidity	1	0.0888	15.27	0.0013
PV	1	1.0837	1.64	0.2191
OD232	1	0.0096	0.42	0.5258
OD270	1	0.00015	0.07	0.7883
Total phenols	1	39285.04	354.99	0.0001
Tocopherols	1	4959.37	18.87	0.0005

* (pr > f) ≤ 0.05 significant, (pr > f) ≤ 0.01 highly significant

Table (6): ANOVA results of the effect of olive harvesting dates on the studied sensory attributes.

Sensory attribute	Olive Variety							
	Rumi				Nabali			
	d f	M.S	F-value	*pr >f	d f	M.S	F-value	*pr >f
Fruity	3	0.0322	3.52	0.0689	3	3.347	91.3	<0.0001
Bitter	3	0.0766	9.2	0.0057	3	1.772	425.33	<0.0001
Pungent	3	0.0275	3.3	0.0786	3	2.551	117.78	<0.0001
Fusty	3	2.7075	63.71	<0.0001	3	2.526	36.98	<0.0001
Musty	3	0.4875	9.75	0.0048	3	0.570	45.0	<0.0001
Muddy sediment	3	0.3700	5.48	0.0242	3	0.270	12.0	0.0025
Rancid	3	0.4475	7.16	0.0118	3	0.487	10.83	0.0034

* (pr > f) ≤ 0.05 significant, (pr > f) ≤ 0.01 highly significant

Table (7): ANOVA results of the effect of olive harvesting dates on the studied chemical variables.

Chemical property	Olive variety							
	Rumi				Nabali			
	d f	M.S	F-value	*Pr>f	d f	M.S	F-value	*Pr>f
Acidity	3	0.0346	5.43	0.0249	3	0.02616	4.98	0.0309
PV	3	12.2	17.55	0.0007	3	17.1275	24.85	0.0009
OD232	3	0.3401	17.64	0.0007	3	0.2777	10.53	0.0038
OD270	3	0.0001	0.05	0.9852	3	0.0004	0.21	0.8882
Total phenols	3	37016.75	493.56	<0.0001	3	40635.5	277.69	<0.0001
Tocopherols	3	2329	7.64	0.0098	3	704.75	3.2	0.0839

* (pr > f) ≤ 0.05 significant, (pr > f) ≤ 0.01 highly significant

phenols content was found. These findings are not in harmony with those of Stefanoudaki *et al.* (2000) who found a positive correlation between the bitter and phenolic compounds. In this respect, Aparicio and Luna (2002) reported that the polyphenolic components are related to the bitterness and astringency of the foods in which they occur (*e.g.* wine, cider, tea, fruits, etc.). They stated that the bitter taste of olives was elicited from oleuropein glucoside and the phenolic acids derived from benzoic and cinnamic acids which are responsible for a bitter mouth-feel while other phenols contribute to a pungent taste. They also reported that oils obtained from olive fruits rich in polyphenols, would be expected to be more bitter and pungent than those coming from "sweet" varieties.

The intensities of bitter and pungent tastes in Nabali olive oil were significantly lower ($p < 0.05$) than that in Rumi olive oil in the first date of harvesting, and then became higher in the next three dates. This result might be due to the difference in the proper harvesting dates between the two varieties.

In conclusions differences in the sensory, physicochemical, and chemical properties were noted in olive oil due to olive variety and olive harvesting dates. From the obtained results in the present study the following could be concluded:

1. The proper harvesting date, where the maturation index is around 5, would depend clearly on olive variety. In Bani Kanana district (North of Jordan), the proper harvesting date for Rumi olive was set during the period 10 – 28/11, which coincided with the second selected harvesting date. In comparison, the most suitable harvesting stage for Nabali olives lies between 22/11-7/12, which coincided with the third selected harvesting date.
2. In general, weak correlation was found between the sensory attributes and some related chemical parameters, while high correlation was found between PV, OD 232nm with total phenol content of olive oil samples.
3. The total phenol contents of olive oil of the two selected olive varieties confirmed earlier studies that they gradually increase up to the most suitable harvesting date then decline.
4. According to the obtained results, the studied olive oil samples could be considered as a good source of phenolic compounds and tocopherols.

Recommendations

Based on the results, the following could be recommended:

1. Harvesting olive at the proper harvesting date or as much as possible close to it in order to produce olive oil in the extra virgin category.
2. Conducting further studies on detecting of other negative attributes such as metallic, winey-vinegary, vegetable water, esparto, earthy, grubby, cucumber etc (proposed by IOOC) in Jordanian olive oil to compare their intensities with the related chemical compounds.

The effect of olive farm altitude on the formation of the phenolic acids such as gallic, benzoic, caffeic, ferulic, vanillic, p-coumaric and shikimic acids, should be assessed.

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العلاقة بين بعض الخصائص الكيميائية والحسية لزيت الزيتون الأردني من صنفي الرومي والنبالي والمنتج خلال مراحل قطف مختلفة

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ملخص

أخذت ٢٤ عينة زيت من صنفي الزيتون الرومي والنبالي المزروعان في منطقة بني كنانة (شمال الأردن) في أربعة مواعيد قطف ابتداءاً من ١١/١ يفصل بين موعد القطف والذي يليه ١٥ يوم، للموسم الزراعي٢٠٠٩ ، بهدف معرفة تاثير الصنف وموعد القطف على الصفات الحسية و الفيزيوكيميائية والكيميائية للزيت المستخرج، و كذلك معرفة العلاقة بين هذه الصفات وتأثيرها على بعضها البعض.

تم التقييم الحسي من قبل لجنة تذوق مدربة لعينات الزيت المستخرجة من كلا الصنفين، و بالتوازي اجريت الفحوصات الفزيوكيميائية والكيمائية [رقم الحموضة، رقم البيروكسيد، الامتصاص النوعي عند طول موجي (٢٣٢ و٢٧٠ نانوميتر)، التوكفيرولات والمواد الفينولية الكلية].

أظهرت نتائج الدراسة وجود علاقة طردية معنوية بين الصفات الحسية الايجابية (الفاكهية والمرارة واللذعة) و تركيز البولي فينول للزيت المستخرج من صنف الزيتون النبالي حتى بلوغ مرحلة القطف المثالية (مرحلة القطف الثالثة)، بينما لم تظهر تلك العلاقة في الزيت المستخرج من صنف الزيتون الرومي.

كانت شدة صفة التزنخ في الزيت المستخرج من صنف الزيتون الرومي معنويا اعلى مما هو في الزيت المستخرج من صنف الزيتون النبالي في جميع مراحل القطف مع عدم وجود علاقة ارتباط بين ظهور الصفة السلبية الناتجة من التزنخ في الزيت المستخرج من كلا الصنفين وبين ارتفاع نسب التزنخ المعبر عنها بقيمة البيروكسيد وقيمة الامتصاص النوعي عند (٢٣٢ و ٢٧٠ نانوميتر).

أظهرت الدراسة وجود علاقة طردية معنوية بين ظهور الصفتين السلبيتين التخمر والتعفن Fusty and Musty في الزيت المستخرج من كلا الصنفين وبين ارتفاع نسبة حموضة الزيت، مع ملاحظة أن هذه العلاقة الطردية كانت أكثر وضوحاً في الزيت المستخرج من صنف الزيتون الرومي أكثر منها في الزيت المستخرج من صنف الزيتون النبالي.

كانت الزيادة مستمرة في قيمة البيروكسيد و قيمة الامتصاص النوعي عند (٢٣٢ و ٢٧٠ نانوميتر) بتقدم موعد القطف لكلا الصنفين، كما زادت المواد الفينولية الكلية زيادة معنوية حتى موعد القطف المثالي ثم بدأت بالتناقص بعد ذلك لكلا الصنفين، أما التوكفيرولات فقد تناقصت بدرجة معنوية بعد موعد القطف المثالي (مرحلة القطف الثانية) للزيت من صنف الرومي.

المجلة العلمية لكلية الزراعة – جامعة القاهرة – المجلد (٦٣) العدد الأول (يناير ٢٠١٢):٤٤–٥١.