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STUDY EFFECT OF REPLACEMENT WALNUT WITH PEANUT ON PROCESSED OLIVE QUALITY

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ABSTRACT

Since the use of walnut in the formulation of industrial processed Olive cause some quality issues with the product, the aim of this study was to evaluate the effect of replacing peanut on qualitative characteristics of the product. For this purpose, peanut ratios (10%, 20%, and 30%) instead of walnuts were used and its impact on the physicochemical properties of samples (smell, taste, consistency, oiling off and peroxide value) during three months was assessed. In the next step, the effect of different percentages of pomegranate paste on sensory evaluation of the product was done. The measurements *were* done *in triplicate*. Data were analysed using SPSS statistical software. The results showed that sample containing 30% of walnuts was the best in term ofsensory properties. with increasing peroxide value and leaving oil during the time, sensory properties of the product contains 30% of walnuts changed and it was significantly different from the product contains 30% of peanuts.

Keywords: peanut, walnut, processed olive, sensory evaluation.

INTRODUCTION

The olive fruit due to nutritional properties (Tardif, 2011) Hygienic, medical and industrial uses has long been the focus of attention. The production of oilseeds in the world in recent decades has been of high growth. The olive tree has always fruit and oil and even its leaves have been used. The olive tree has got a lot of variety and is grown in different countries in different ways and different products in terms of size and color of the fruit is obtained (Hatzopoulos *et al.* 2002; Owen *et al*. 2005). Evidence shows that for the first time in the sixteenth century it has been producing in the center of Italy (Riley 2002), If in our country there is an urgent need for this food has no significant role in this development (Tripoli, 2005; Wang,2008). Olive is a Mediterranean plant that grows in tropical and subtropical climates. Its scientific name is Oleaeuropaea. The dispersal of the plant is in the countries of the Mediterranean, North Africa, Southeast Asia, north to southern China, Australia, Scotland and East (Haloui 2010). In Iran, the plant in the Zagros Mountains and the provinces of Fars, Lorestan, Ilam, Kohkiloueh to Kermanshah and Khuzestan, Gilan cultivate (Maghsodi, 1387), and its production is to 100 thousand tons annually (Ministry of Agriculture, Department of projects and programs). More economic Olive Garden's local crop varieties are yellow and Fishmi figures, Shengi and Mari levels can be seen very limited. The yellow variety is native to Iran and is yielding digit and its oil content is high and it is the country's largest area under olive cultivation. This kind of olive can be harvested for canning and oil extraction (Myrmansury, 1375;Homapur*et al*., 1393). In terms of nutritional value, olive isrich in Linoleic acid (omega-6fatty acids) (Maki KC,2010),antioxidants (EFSA, 2012), Phytosterols and unsaturated fatty acids (Maguire *et al*., 2004); Also in terms of health benefits it can increase the absorption of minerals such as calcium, magnesium and iron, and prevent Alzheimer's disease and reduce inflammation in rheumatoid (Tripoli, 2005;Wang,2008). Olives as one of the most important modulators of insulin in the blood has an important role in the control and prevention of diabetes (El SN, Karakaya, 2009).Olive is an indigenous crop in the north of the country where it is produced from olives, walnuts, pomegranate juice, pomegranate paste and other herbs is used (Rossiter, 2012;Garrido Fernandez.1997). This product often is provided in the traditional way but in the industrial manner cooking and pasteurization and blanching process leads to oilingoff and higher peroxide value. No study has been performed on processed olive and only a few studies investigated the physicochemical and nutritional properties of olive and its oil. In this field of study, Wu *et al*. (2002) examined Compatibility between *olive cultivar*, or Microbiological and physicochemical changes of naturally black olives fermented at different temperatures and NaCl levels in the brines by Tassou *et al*. (2002) was conducted. Given that so far, no study has been done in optimization of processed Olive formula and its quality, the aim of this study was to evaluate the replacement of walnuts with peanuts on products' quality.

Materials and methods

Sample preparation

Processed Olive samples were prepared in accordance with the formula (Table-1).

Table1. Comparison olive compounds in various treatments.

	Olive mixed with peanut								Olive mix with walnut							
	Aromatic herbs	Angelica	Salt	Pomegranate	olive oil	Peanut	Walnut	Olive	Aromatic herbs	Angelica	Salt	Pomegranate	olive oil	Peanut	Walnut	Olive
1	2.5%	0.5%	2.5%	10%	0	10%	0	50%	2.5%	0.5%	2.5 %	10%	0	0	10%	50%
2	2.5%	0.5%	2.5%	15%	0	20%	0	55%	2.5%	0.5%	2.5 %	15%	0	0	20%	55%
3	2.5%	0.5%	2.5%	20%	0	30%	0	60%	2.5%	0.5%	2.5 %	20%	0	0	30%	60%

Method of preparation

Bitterness remove from green olives by salt water and then rinse the olives with water in four steps, next, pit the olives and Blanch it at 80°C. afterward, the certain ratio of walnuts or peanuts, herbs, and other ingredients were poured into the cooking pot (first cooking). When the concentration of olive sauce reached to the desired concentration blanched olives were added and second cooking was done. Pasteurization process was performed. Microbial properties of processed olives were done according to the national standard 2326 no. 1374.

Oxidative stability evaluation

Measurement of peroxide value (PV) as an index for primary lipid oxidation was carried out according to analytical methods described in AOAC Official 965/33. A mixture of chloroform and acetic acid（2 : 3), a saturated solution of potassium iodide and Sodium thiosulfate solution was used.

Sensory analysis

Sensory analysis of processed olive was performed by a panel of ten panelists. The panelists evaluated the samples for odor, color, consistency and oilingoff on a five-point hedonicscale.

Statistical analysis:

Statistical analysis was performed using the software SPSS16 for windows .To evaluate the amount of peroxide in processed Olive with different ratios of peanuts (10%, 20%, and 30%) and walnuts (10%, 20%, and 30%) and also the effect of peanuts on sensory scores, data were subjected to analysis of variance (ANOVA). The t-test was *used to compare the average of* sensory scores for the different formulation. Significance was defined at $p < 0.05$. All measurements were carried out in duplicate.

RESULTS AND DISCUSSIONS

Peroxide value

Table-2 reveals the effect of different treatments in processed olive on peroxide value. According to the analysis of variance and Duncan's post hoc test it can be found that there is a significant difference between samples contains 10, 20, and 30% of nuts. With increasing percentages of nuts, peroxide value was increased. As it can be seen in the table above the highest amount of peroxide was in processed olive contains 30% of walnuts and the lowest peroxide content was determined in samples contains 10% of peanuts ($p< 0.05$).According to Najafi *et al*., (2015) processing can decrease peroxide value in olive from 8.74 to 6.03 meqO_2/Kg oil. Gharibzahedi *et al*., (2014) reported peroxide values of walnut oils extracted from Toyserkan, Chaboksar and Karaj cultivars that were 1.9, 3.1 and 2.2 meqO_2/kg of oil, respectively. The higher peroxide value in the oil extracted from walnut oil is probably due to a low amount of bioactive compounds like phenolic substances.

Table2. The effect of different percentages of walnuts and peanuts in processed olive on peroxide value.

Treatment (%)	**Peroxide value** (%)	
	walnut	**peanut**
10	18.33 ± 8.5^{c}	15.67 ± 6.03^{c}
20	24.33 ± 12.7^{b}	21.33 ± 10.07^{b}
30	31.33 ± 16.16^{a}	27 ± 13.53^{a}

The values represent ± standard errors;n:3per experimental replicate; means within the same column with different letters are different ($p< 0.05$)

Sensory evaluation

The sensory analysis results are presented in Table-3.It can be concluded that there are no significant differences ($p< 0.05$) for leaving oil between samples treated with different percentages of peanuts. Significant differences ($p< 0.05$) were determined for odor, color and consistency between samples, consistency score increased with increasing the percentage of peanuts. Sensory scores of all samples contain walnuts significantly increased ($p< 0.05$) as the percentages of walnut increased. Serreno *et al*. (2004) reported the detection of slight off-flavour (walnut-like) in the restructured beef steak with walnuts, which was more noticeable ($P < 0.05$) in the product that had the higher percentage of added walnut. Similar results have been reported by Jiménez Colmenero *et al*. (2003) in beef steak added with walnuts. The results of Bede (2007) showed that the samples with peanut incorporated were more acceptable than the chin-chin samples (a pastry product) made without peanut. Sample with 10% w/w groundnut was the most preferred in all the organoleptic

qualities. This suggests that 10% w/w incorporation of peanut in 'chin-chin' will be the best mixing ratio of incorporation of peanut.

Table-3. Mean sensory scores of processed olive with different percentages of nuts.

Sensory parameter	Peanut (%)			Walnut (%)		
	10	20	30	10	20	30
Color	3	4.5	4	3	4	5
Odor	4	4.5	3	4	4.5	5
Consistency	3.5	4.5	5	3	4.5	5
Leaving oil	2	2	2	4	4	5

The effects of percentages of pomegranate paste and kind of nut on sensory properties are shown in Figure-1. Sensory results in term of oiling off indicated that the processed olive contains nut was not affected by different percentages of pomegranate paste (Figure-1-a). Results also showed that processed olive had acceptable color with increased levels of pomegranate paste until 20%($p< 0.05$) (Figure-1-b).

The highest score for odor was obtained in the processed olive contains peanut and walnut followed by 15 and 20% pomegranate paste and the lowest score was seen in the processed olive contains peanut and 20% of pomegranate paste. These findings were significantly different ($p<0.05$) (Figure-1-c).

The consistency acceptability results showed that there is an increasing trend in scores when the percentage of pomegranate paste increases from 15 to 20% (Figure-1-d).

This showed that the presence of pomegranate paste in processed olive influenced significantly ($p<0.05$) on the consistency acceptability.

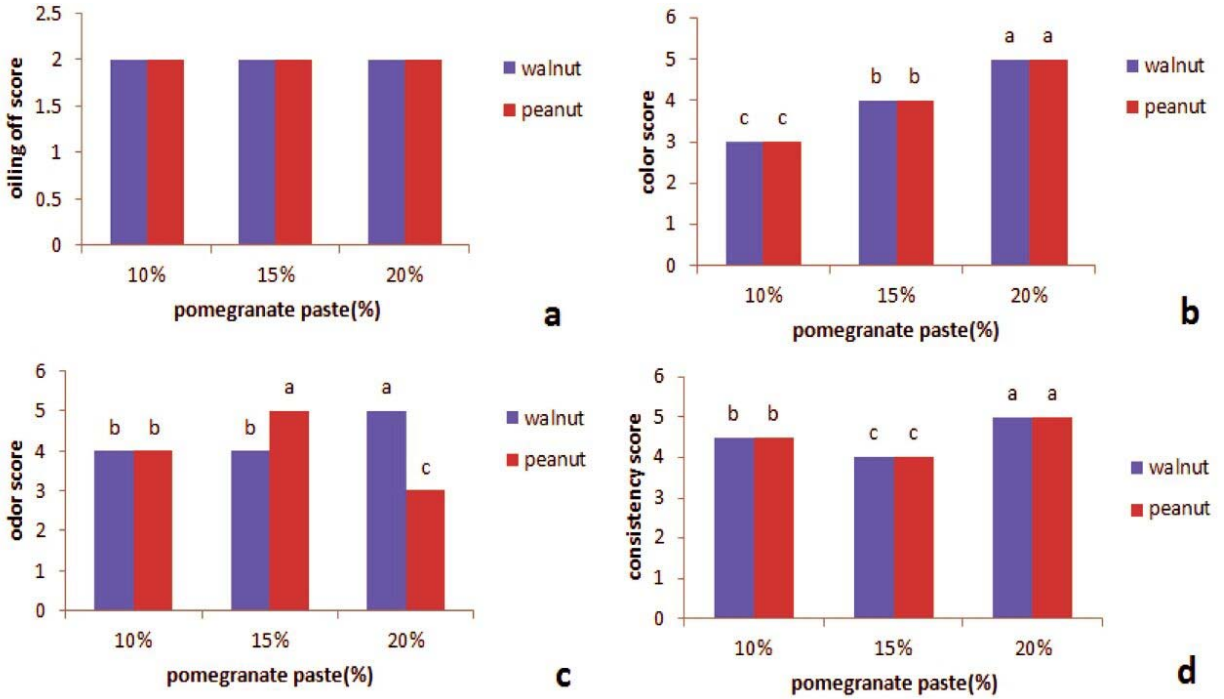

Figure-1. Interaction effect of pomegranate paste% and kind of nut on oiling off (a), color (b), odor (c) and consistency (d) of processed olive

CONCLUSIONS

It can be concluded that the samples contain walnuts had the higher sensory scores in comparison to samples contain peanuts. Our other findings also showed that the peroxide value in processed olive with walnut is more than olive with peanut, it is probably due to the walnut oiling off from the sample during the two-step heating and pasteurization. So it can be declared the lowest peroxide value was seen in processed olive contain peanuts. The best sensory scores in color, odor and consistency were observed in samples contain 30% of walnut. However the maximum oilingoff which could

adversely affect the appearance of the product was seen in this sample. As well as the best consistency of the product was observed in processed olive formula contains 30% of nuts. Based on the above results, it is remarkable the high acceptability scores obtained in the presence of 20% of pomegranate paste.

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