Declaration:

I certify that this thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged, and that this thesis or any part of the same has not been submitted for a higher degree in any other university or institution.

Signed: ……..

Mahmoud Nasr Amarna

Date:18.01.2010

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Abstract

The aim of this study is to investigate the quality of olive oil in North West Bank which is a representative of Palestinian olive oil. 40 samples were analyzes for iodine number, peroxide value, refractive index and free acidity using AOAC official method of analysis for fats and oils. Nitric acid test was also performed to indicate the olive oil purity (mixing with other oils). Steradienes content of the samples, which is a parameter used to test adulteration of olive oil and to test the presence of refined vegetable oils in virgin olive oil, has also been determined using the standard method (ISO171588-2).

To determine the effect of storage conditions on the quality of olive oil; two groups of olive oil samples were analyzed for steradienes content after 7 months of storage in dark conditions at room temperature and at 4°C. Other factors that may affect olive oil quality were also investigated. These factors are: use of fertilizers and pesticides, way of olive fruit collection and olive oil extraction method and some of metrological factors.

Results have shown that the average iodine number of the olive oil samples studied is 91.8 cg/g with refractive index of 1.4696 and free acid value of 1.22% and peroxide value of 19.1 meq/kg. Additionally, all samples have shown negative nitric acid test. These parameters are within virgin olive oil characteristics.

It was also found that the average of total Steradienes content of the studied olive oil samples is 0.45 mg/kg. These total Steradienes includes stigmastadiene (0.13 mg/kg), Cholestadiene (0.28 mg/kg), Stigmastatriene (0.01 mg/kg), and Campestadiene (0.03

mg/kg). According to the limit of stigmastadienes of virgin olive oil (0.15 mg/kg), the olive oil of North West Bank is virgin olive oil.

Samples were collected from two villages: Assera Al Shamalia (locates on North Eastern foothills) and Bet Dagan (Locates on Eastern foothills). The comparesion of olive oil quality parameters results for the two village's samples that differences in metrological factors and harvesting times between the two villages cause differences in olive oil quality and higher content of stigmastadiene in Bet Dagan than Assera olive oil.

The Classification of Palestinian olive oil (represented by Assera and Bet Dagan olive oil) according to acidity value and peroxide includes the following classes: Extra virgin olive oil (25%), Virgin olive oil (42.5%), Ordinary virgin olive oil (7.5%), Lampante olive oil (5%) and Olive oil (20%).

الخلاصة

هدفت هذه الدراسة الى للتحقق من نوعية وجودة زيت الزيتون في شمال الضفة الغربيـة كممثـل لزيت الزيتون الفلسطيني. تم جمع 40 عينة من زيت زيتون في منطقة الدراسة، حيث اجريت لكل عينة الفحوص التالية: فحص رقم اليود، فحص رقم البيروكسيد، معامل الإنكسار عنـد 20 درجـة مئوية بالاضافة لفحص الحموضة (بنسبة مئوية مقدرة كحامض الاوليك)، وذلك باستخدام الطـرق الرسمية والمعتمدة لاجراء هذه الفحوصات (AOAC) من أجل تحليل الدهون والزيوت. كمـا تـم اجراء فحص للكشف عن درجة النقاوة لزيت الزيتون باستخدام حامض النتريك (للكشف اذا ما كان الزيت ممزوج بنوع اخر من الزيوت ام لا). تم اجراء فحص لتركيز ال Steradienes الموجـودة في زيت الزيتون، حيث ان هذا الفحص يستخدم لاختبار خلط زيت الزيتون بزيوت اخرى وللكشف عن وجود الزيوت النباتية المكررة في زيت الزيتون البكر ، حيث تـم فحـصها وتحديـد كميتهـا باستخدام الطريقة المعتمدة (ISO171588 - 2).

لتحديد مدى تأثير ظروف التخزين على جودة زيت الزيتون ؛ تم تخزين مجموعتين مـن عينـات زيت الزيتون وجرى تحليلهما لمحتوى Steradienes بعد 7 أشهر من التخزين في ظروف الظلام وضمن درجة حرارة الغرفة ، وعند 4 درجات مئوية. كما تمت دراسة مجموعـة مـن العوامـل الأخرى التي قد تؤثر على جودة زيت الزيتون وتشمل هذه العوامل مـايلي : اسـتخدام الأسـمدة

والمبيدات الحشرية ، وطريقة جمع الزيتون بالاضافة لطريقة استخلاص زيت الزيتـون وبعـض العوامل المناخية ذات العلاقة.

وقد أظهرت النتائج أن متوسط قيم الفحوصات التي تم اجرائها لعينات زيت الزيتـون فـي شـمال الضفة الغربية هي: رقم اليود (91.8 cg/g) ، معامل الإنكـسار (1.4696)، الحموضـة (نـسبة مئوية مقدرة كحامض اوليك) (1.22 ٪) ، وقيمـة رقـم البيروكـسيد (19.1 meq/kg). وقـد أظهرت جميع العينات سلبية لاختبار حامض النتريك (مما يدل على نقاوة العينات)؛ حيـث ان هـذه المعدلات لفحوصات زيت الزيتون في شمال الضفة الغربية هي ضمن خصائص زيـت الزيتـون البكر.

تبين أيضا أن متوسط مجموع محتوى عينات زيت الزيتون التى تمت دراستها مـن مركبـات ال Steradienes هو (0.45 mg/kg). حيث تشمل مركبات ال Steradienes كلا مـن المركبـات التالية: مركب ال Stigmastadiene وبمعـدل (0.13 mg/kg) ، مركـب ال Cholestadiene وبمعدل (0.28 mg/kg) ، مركب ال Stigmastatriene وبمعدل (0.01 mg/kg) بالاضافة الى مركب ال Campestadiene وبمعدل (0.03 mg/kg) ؛ حيث ان القيمة المسموح بوجودها بهـا من مركب ال Stigmastadienes في زيت الزيتون البكر هي وبحد اقصى (0.15 mg/kg).

تم جمع عينات هذه الدراسة من قريتي : عصيرة الشمالية (والتي تقع ضمن الـشمالية الـشرقية) وبيت دجن (والتي تقع ضمن السفوح الشرقية)، حيث تبين من مقارنة نتائج فحوص زيت الزيتـون لعينات القريتين ان اختلاف العوامل المناخية والاختلاف في اوقات جمع محصول الزيتون ادت الى تباين في قيم فحوص جودة الزيت بالاضافة الى ارتفاع محتـوى Stigmastadiene فـي زيـت الزيتون لقرية بيت دجن مقارنة بزيت الزيتون في قرية عصيرة الشمالية.

تم تصنيف جودة زيت الزيتون الفلسطيني - ممثلا بمنتج عصيرة الشمالية وبيت دجن – وبناء على نتائج الحموضة والبيروكسيد الى الصناف التالية:

- زيت ويتون بكر ممتاز بنسبة 25%.
- ويت ويتون بكر بنسبة 42.5%.
- ويت ويتون بكر عادي بنسبة 7.5%.
- زيت زيتون مكرر – لامبنت – بنسبة 55.
- ويزت زيتون بنسبة 20%.

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List of Privations

Privations	Meaning
TAG	triacylglycerol
meq/kg	mill-equivalents contained in 1000g
EVOO	Extra Virgin Olive Oil
IOOC	international olive oil council
PV	peroxide value
º C	Degree Celsius
AOAC	Association of Official Analytical Chemists
UV	Ultra Violet
RP- HPLC	Reversed-Phase high performance liquid chromatography
cg/g	Centigram per gram
Oct.	October
Nov.	November
Max.	Maximum
Min.	Minimum
Kg	Kilogram
g	gram
Vol.	volume
etc	etcetera