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Research Article



Estimation of some nutritional values and mineral elements in some oil extracts from medicinal plants

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Abstract

The study included evaluating the following bio-chemical evidence (Moisture, the percentage of the total Solid materials, the percentage of the extracted Oil, Acid Value, Iodine Value, Saponifying Value, Ester Value and Peroxide Value). The extracted oil of poupied had the higher ratio of the acid Value (27) whereas the ginger is recorded the lowest ratio of the acid Value (0.08). The extracted oil of the radish Seed is registered the highest (201.1) Concentration of the Saponifying Value whereas the extracted oil of the frozen fish (71.8) had Contained the lowest degree of the Saponifying Value. For the Ester value ,the free fat of sheep is given the higher(199.8) ratio whereas the extracted oil of frozen fish is indicated the lesser ratio(70.6) .For Iodine value the extracted oil of linseed is reached to highest (170.7) ratio while the butter is granted the lesser(31.7) ratio .As regard to the Peroxide value in the almond(21.4) oil while the lower value was in the free fat sheep (31.7). the study focused on assessing some of the mineral elements (Calcium, Potassium, Zinc, Iron and Magnesium). The sunflower oil had the highest concentration in Ca (2.1), K (9.0), Fe (0.9) and Mg (1.05) where the olive oil is registered the highest concentration in Zinc (0.3)

Keywords Moisture, Total Solids, Acid Value, Saponification Value, Iodine Value, Ester Value, Peroxide Value, Element

Introduction

Fats have been an essential component of human food for more than two million years. Historically, we cannot determine the beginning of man's knowledge of oils and fats, but it is believed that they were known in ancient times as a source of food and a means of lighting. The oldest vegetable oil known to man is olive oil, and the oldest animal fat known to him. Human is butter, but nowadays man has been able to extract oils from different seeds and fruits and from the livers of whales and fish (Murray et al., 1996) and fats are very important food components not only because of the high energy they provide to the body, but because they contain effective substances Biological such as steroid hormones, bile acids and prostaglandins, in addition to the fact that fats have important functional structures such as sphencosin and vitamins (Denke et al., 1992) Most of the fats and oils consumed daily are a mixture of triglycerides with small amounts of the rest of the fats such as cholesterol,

phospholipids and free fatty acids Essential Fatty Acid they are acids that the body cannot manufacture, but obtains them from various foods, such as linoleic acid, as this acid is available in corn oil and in sunflower oil, and the essential nutrients for humans include many vitamins and minerals and at least two fatty acids (Michaels and Suchocki, 2007). The simple definition of basic foodstuffs in general: they are foodstuffs that the body cannot manufacture or that it does not manufacture sufficient quantities of them to meet its physiological need for them, and that their deficiency leads to specific diseases, and not all materials are essential for all types of animals, for example, vitamin C is essential for humans, but it is not for dogs, the dog's body can make the vitamin C it needs. It is a polyunsaturated fatty acid, which is important for human health, and the human body needs it, but it does not have the ability to manufacture it, and therefore it must be available in food, so it was called essential fatty acids (AL-Aqedy, 2004).

Materials and methods

Plant solid samples (seeds) were selected on the basis of their quality and suitability. As for oils, they were selected on the basis of different origins, frequent use and availability in the local markets. After cleaning and cutting fish and meat, and then taking tissues from them only, they were extracted using the Play and Dyer method, which is used in the case of oil extraction or the fat is one of the samples with a high percentage of moisture, as two types of solvents are used, the first is non-polar (chloroform) and the other is polar (methanol). As for the solid samples (seeds), they were cleaned and ground and then extracted by intermittent extraction method using Soxhlet and petroleum ether (60-40) as a solvent.

Determination of chemical components

1-Moisture: It was estimated in a thermal oven at a temperature of 130°C for one hour, until the weight was stable (Chopra et al., 1991).

2-The percentage of the total Solid materials: They were estimated after losing moisture from the sample (Chopra et al., 1991).

3-Acid Value: - A measure on the basis of oleic acid using 10 g of oil or fat in an alcoholic medium and crushed with a KOH solution at a concentration of 0.1N (OA, 1964).

4-Iodine Value: Measured in 0.4 g of oil or fat, using Hubble's solution, and rubbed with 0.1 N (18 N) sodium thiosulfate solution (Bhawan, 2012).

5-Saponifying Value: Put in 5 g of oil or fat in an alkaline alcohol medium and rub it with a 0.1N HCL solution (Alireza et al., 2010).

6-The ester Value was estimated through the equation, the ester number = the soap number - the acid number (Xu, 2010).

7-Peroxide Value: It was measured in 5 g of the sample and using a mixture of chlorform solvent and glacial acetic acid, and crushed with sodium thiosulfate at a concentration of (Xu, 2010).

8-The percentage of extracted fat or oil: It was estimated in 100 g of used samples (U.P.A.C. 1979).

9-The elements (Ca, K, Mg, Zn, Fe) were estimated by an atomic absorption spectrometer (Al-Samarrai et al., 2013).

Results and discussion

Moisture and total solids: The moisture content of flax seeds was estimated and found equal to 3.5% and the percentage of total solids was 96.5% and this result is consistent with what

was reached by (Deman, 2010). As for the moisture in black seed seeds it was 1.3%, and the percentage of total solids was 98.7%, as for the oil or fat extracted from carp fish / ponds, it was 17.6%, while for flax seeds, the percentage of extracted oil was 37%, and this result is consistent with what was reached by (Keefer, 2010). While the percentage of oil extracted from black seed seeds was 19.4%, and this does not agree with what was reached by (13), and the reason may be due to the effect of storage temperature and humidity during the storage period, which activated the enzymatic decomposition process in the seeds (Randanini et al., 2003).

Table 1. It shows the percentage of moisture and total solids in the following samples.

Seq	Sample	% Moisture	% Total solids
1	Flaxseed	%3.5	%96.5
2	radish love	%3.9	%96.1
3	Sesame	%4.7	%95.3
4	black bean	%1.3	%98.7
5	Berbene	%5.3	%94.7

Acid value, saponification value, iodine and ester value of samples

Table 2. shows the acid valu, saponification valu, iodine and ester for the following samples

Sample	Acid value	Saponification value	Iodine value	Ester value	Peroxide value
Carb/sinks	2.1	185	155	182.9	7.2
Butter	0.21	199.7	31.7	199.47	2.8
Sunflower Oil	0.17	171	122.9	170.93	13.6
Black Seed Oil	3.4	185	90.4	181.6	2.0
Linseed oil	1.4	185.1	195.6	183.7	6.8

Acid, ester, iodine and soap valu of the samples. Through Table 2, it is clear that the calculated peroxide number values ranged from the highest value of 13.6 in sunflower oil to the lowest value of 2.0 in oil extracted from black seed, while the rest of the samples recorded values of 7.2, 2.8 and 6.8 For each of the oil extracted from carp fish / ponds, butter, and oil extracted from flax seeds, respectively. As for the esterial number, the calculated values ranged from the highest value of 199.47 in butter to the lowest value of 170.93 in sunflower oil, while the rest of the samples recorded values of 182.9 and 181.6 and 183.7 for each oil extracted from carp fish, oil extracted from black seed, oil extracted from flax seeds, respectively. As for the acidity number, the calculated values ranged from the highest value of 3.4 for oil extracted from black seed to the lowest value of 0.17 in butter, while the rest of the samples were recorded. The values are 2.1, 0.21 and 1.4 for the oil extracted from carp, butter, and oil extracted from flax, respectively. As for the iodine figure, the values

calculated for it ranged from the highest value of 195.6 for the oil extracted from flax seeds to the lowest value recorded 31.7 for butter, while the values of 155, 122.9 and 90.4 were recorded for each of the oil extracted from carp fish / ponds, sunflower oil, black seed on the respectively and as in the Table 2.

Extracting oils and fats

It is clear from Table 3 that the highest percentage of extracted oil for animal samples was found in carp fish / ponds, which is equal to 21.6%, and the lowest percentage was recorded at 2.9% in seawater / river fish. As for the rest of the samples, it was recorded 10.4%, 9.3% and 7. 4%, 9.8%, and 13.3% for each of frozen fish, tan/ river fish, Indonesian/ river fish, beef, and lamb, respectively. As for the vegetable samples, the highest percentage of sesame seeds was recorded, amounting to 47%, and the lowest percentage recorded for paraben. It reached 11.4%, while the rest of the values were 37%, 32% and 19.4% for each of flaxseed, radish seed and black seed, respectively. as in the Table 3.

Table 3. Shows the name of the sample and the percentage of oil or fat extracted from it

Seq	Sample	% fat or oil
1	Carb fish (ponds)	%21.6
2	Marine frozen fish (slices)	%10.4
3	Thickness	%9.3
4	An indoic fish river	%7.4
5	Shallaj river thickness	%2.9
6	Beef	%9.8
7	Sheep meat	%13.3
8	Flax seeds	%37
9	Perbin seeds	%11.4
10	Sesame	%47
11	Radish seeds	%32
12	Black bean	%19.4

Estimate of element

Calculated values for iron ranged from the highest concentration of 0.9512 in sunflower to the lowest concentration of 0.1382 in the oil extracted from the black seed, while the concentrations were 0.5284, 0.333, and 0.2357 each of the oil extracted from flax, butter, and oil extracted from flax seeds, respectively. The highest concentration of 0.15017 was recorded in the butter, to the lowest concentration of 0.05, the oil extracted from the fish of Karb as for the concentrations 0.0857, 0.1018, and 0.1372 for each of the oil extracted from and the oil extracted from black seed and sunflower, respectively. Its concentration is 2.1875 in sunflower oil for a concentration of 0.3906 in a concentration of greater concentration on its 9.02777 concentration in sunflower oil for a concentration of 2.08333

concentration in the oil: drawing and learning 4.58333 and 2.3 6111 and 6.25 for each oil Sunflower oil and its lowest concentration of 0.1577 in the extracted oil Of carp fish and the rest recorded 0.4186, 0.8534 and 0.5677 for each of the oil extracted from black seed and butter, respectively. It was found that the highest percentage of iron, calcium, magnesium and potassium is present in the rotating oil, followed by the oil extracted from the extracted olive oil, which contains a high percentage of Iron and Magnesium As for zinc, the highest percentage of it is found in butter, followed by sunflower, then extracted oil, then olive oil extracted from extracted olive oil. as Table 4.

Table 4. Shows the concentration of the following elements in the samples mentioned in ppm

Sample	Con.ppm				
	Fe	Zn	Ca	K	Mg
Oil Extract of Black Seed	0.1382	0.0857	1.4843	4.58333	0.4186
flaxseed oil	0.5284	0.1018	1.25	2.08333	0.8534
sunflower oil	0.9512	0.1372	2.1875	9.02777	1.0521
Butter	0.333	0.15017	0.7187	2.36111	0.5677
Oil extracted from carp fish	0.2357	0.05	0.3906	6.25	0.1577

Conflict of Interest

The author hereby declares no conflict of interest.

Consent for publication

The author declares that the work has consent for publication

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References

AL-Aqeedy, T. N., Ahmad, O. (2004). Variation in Protein Content, Oil, Percent, Fatty Acids, Callus Induction, Growth and Differentiation in Genetically Varied Plants of Sun Flower (*Helianthus annuus* L.) by Effect of Physical Mutagene (Gamma Rays). To The Council of the College of Education in Mosul University in Biology. As A partial Fulfillment for the Requirements of the Degree of Master in Biotechnology.

Alireza, S., Tan, C. P., Hamed, M., & Che Man, Y. B. (2010). Effect of frying process on fatty acid composition and iodine value of selected vegetable oils and their blends. *International Food Research Journal*, 17(2), 295-302.

Al-Samarrai, Yasmine, H. (2013). A biochemical study of the production of microbial culture media from local plant sources and a study of the

- most important chemical components of it. Master Thesis, Samarra University, pp. (34-35).
- Chopra, S. L., & Kanwar, J. S. (1991). In Analytical Agricultural Chemistry. Vol.
- Demian, W. (2010). Effect nitrogen fertilization on protine content ,total fatty acid content and composition of barley (*Hardum vulgare* L.) grains. *J. Sci. food agric.*36:186-190.
- Denke, M. A., & Grundy, S. M. (1992). Comparison of effects of lauric acid and palmitic acid on plasma lipids and lipoproteins. *The American journal of clinical nutrition*, 56(5), 895-898.
- Hamid, F., & Hamid, F. H. (2015). Manual of methods of analysis of foods. *Food safety and standards authority of India*.
- Keefer, G. D., McAllister, J. E., Uridge, E. S., & Simpson, B. W. (1976). Time of planting effects on development, yield and oil quality of irrigated sunflower. *Australian Journal of Experimental Agriculture*, 16(80), 417-422.
- Michaels, J., Suchocki, A. (2007). *Conceptula Chemistry*. Third Edition. Saint College, p 615.
- Murray, R. K., Granner, D. K., Mayes, P. A., Rodwell, V. W. (1996). "Harpers Biochemistry". Appleton and Lange, USA. pp 146-261.
- OA.O.C.S. Official and Tentative Methods , 3rd edition American Oil Chemis t's Society . Chicago U.S. A., 1964
- Rondanini, D., Savin, R., & Hall, A. J. (2003). Dynamics of fruit growth and oil quality of sunflower (*Helianthus annuus* L.) exposed to brief intervals of high temperature during grain filling. *Field Crops Research*, 83(1), 79-90.
- U.P.A.C. Standard and Methods For the Analysis of Oils Fats and Derivatives 6th ed , International Union of Pure and applied chemistry Perryamon Press. C., Paquot U.K. 17.P.,1979.
- Xu, X. Q., Tran, V. H. (2010). Physicochemical Studies on Sunflower Oil Blended with Cold Pressed Tiger Nut Oil, during Deep Frying Process *Journal Home*, 10(10).

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