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EFFECT OF HUMAN NUTRITION BY MEALS CONTAINING GHEE, OLIVE OIL, AND A BLEND OF THEM ON SERUM LIPIDS.

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:[١M]Comment

ABSTRACT

This research was conducted for the lack of the quantity of corn sufficient to obtain the pure corn oil which are found in a large quantity in the market. The reason is that embryo weight represents ٤٪ of the weight of corn grain and the proportion of corn oil in embryo ٢٥-٢٧ % of its weight. So tons of maize needed to get ١٠ kilograms of oil, if the oil extraction rate ١٠٠٪ and this is impossible. Also some investigators, showed that corn oil and other industrial seed oils promote strongly prostate cancer cell growth and increase mortality.

As well as the desire of consumers to ghee nutrition because of their taste , distinctive flavor and beneficial effects on brain cells and afraid at the same time a high proportion of cholesterol in the blood.

Where experiments were carried out on nutrition human where meals are contained ghee with olive oil each separately and mix them as a source of fats (٢٥: ٢٩ % of total energy). The analysis of the fatty acids present in olive oil and buffalo ghee, showed that olive oil was free of cholesterol's and short chain fatty acids (٤:١٥ C). While, ghee contained ١٨٠ mg/dl and short chain fatty acids.

The design of experiments has been developed on the basis of three variables, each variable at three levels as following:

١ – The practice of physical activity, at three levels (do not engage in any activity – without regular exercise – exercise regularly). By a proposed training program for the development of the element of balance and stability during movement in the compulsory kata karate. The program includes a number of physical techniques and exercises to build muscles of the upper limb (forearm) for fist and lower limb (thigh) kicked. And skills necessary for a group that practiced karate on a regular basis. And subjected to a diet program, Faculty of Physical Education - University of Kafr-El-Sheikh.

٢ – The age group, and there levels are (less than ٢٠ years old – from ٢٠:٣٠ years old – more than ٣٠ years old).

٣ – The obesity, and there levels are (thin – average – fat).

The blood sample was drawn from all individuals participating in the experiment and assess triglyceride (TG) , low lipoprotein (LDL-c) , high (HDL-c) density and total cholesterol (TC) and the exclusion of non-matching samples (Referencerange).

Diet Nutrition (based on ٣٠٪ of energy from fat) conducted for three consecutive weeks and then a blood sample was withdrawn and another week after feeding. And calculate the averages for each of the TG, LDL-c, HDL-c, and TC.

The results found that feeding diets containing ghee raise the proportion of about ٧٪ cholesterol and reduce triglycerides .The practice of sports activities and age group less than ٢٠ years old and medium weight less influence from the other . Feeding diets containing olive oil reduces cholesterol including high density lipoprotein

cholesterol and raise the proportion of TG, which may be also a risk to public health . The practice of physical activity reduces triglycerides and reduce cholesterol, especially low-density.

Diets containing a mixture of ghee and olive oil did not cause change , both in the level of cholesterol or triglycerides for individuals who engage in sports activities. On this basis, feeding is a mixture of ghee and olive oil feeding healthy, safe, to avoid the diseases of blood, heart and arteries, especially when the practice of physical activity for the building blocks of muscles and overcoming. The good of vegetable oils in general with the statement ratios between omega-٦ and omega-٣ and modified by mixing vegetable oil with each other to become the ratio between omega-٦: omega-٣ is ٤: ١ to amend any mixing ratios to avoid the risk of cancer.

INTRODUCTION

This research was conducted for the lack of the quantity of corn sufficient to obtain pure corn oil , which are found in a large quantity in the market. Our previous studies on ٨ corn varieties which cultivated in Egypt namely single hyper named (Giza١٢٩and Bashaier١٣ as white varieties – Pioneer and Giza ١٥٥ as yellow corn varieties). Three hyper named (Wattania and Nevertity as white –Giza ٣٥١and ٣٥٢ as yellow corn), showed that corn embryo weight represents ٤٪ of the weight of corn grain and the proportion of corn oil in embryo represents ٢٥-٢٧ % of its weight. So , tons of maize needed to get ١٠ kilograms of oil, if the oil extraction rate ١٠٠٪ and this is impossible.

Also some investigators, showed that corn oil and other industrial seed oils promote strongly prostate cancer cell growth and increase mortality.

In fact, there have even been several experiments showing that butter and other animal fats promote cancer growth to a lesser degree than margarine and omega-٦-rich seed oil. A high intake of omega-٦ fatty acids may increase the likelihood that postmenopausal women will develop breast cancer (Emily, *et al*., ٢٠٠٨) .Similar effect was observed on prostate cancer (Yong, *et al.,* ٢٠٠٧). Other analysis suggested an inverse association between total polyunsaturated fatty acids and breast cancer risk (Valeria, *et al.,* ٢٠٠١).Ghee is widely used in food habits of Arabic zone. Ghee supports the functioning of the brain. Excessive mental work can aggravate Prana Vata, which is responsible for creative thinking and reasoning. PranaVata, when out of balance, will dry out Tarpaka Kapha, the dosha that lubricates the brain. Cooking of ghee regularly considered a rasayana is its medhya quality supports the moisturizing effect of Tarpaka Kapha (Ayurveda, ٢٠٠٦). Ghee also, enhances the quality and quantity of Ojas, the master coordinator of mind are necessary for the development of our full human potential or enlightenment. The proper amount of ghee also enhances Agni (Digestive fire). But too much ghee has think of a ghee lamp: in order to burn it you need to keep adding ghee. Ghee, which is rich in saturated fatty acids it produced from butter of cow or buffalo milk fat. Because ghee has such a high smoke point (٢٥٢ ºc) it is a very useful oil for cooking. The smoke point determines when oil actually starts to burn and generate oxidation and the potential free radicals. As it has a very low oxidation rate ghee stays fresh even UN - refrigerated for a long time. Another benefit of using ghee is that the heating

procedure removes the lactose content making it tolerable to those sensitive to lactose (Ayurveda, ٢٠٠٦).

Valeria, *et al.* (٢٠٠١) reported that the type of fatty substances is major factor of blood cholesterol level (solid fats raise this level, while oils lower it).

This research was conducted for the purpose of the lack of quantities corn dominating for pure corn oil.

On other hand dairy products make an appreciable contribution to saturated fat and cholesterol intake. Consumption these products may be correlated with high blood cholesterol level, (Rossouw, *et al.*, ١٩٨١).

High blood cholesterol is the major risk factor for cerebrovascular disease (NCEP.١٩٩٣).

Through a period of time many research workers showed a direct relation between cholesterol and the occurrence of coronary heart disease, (John , *et al*. ١٩٩٠ and Rawashdeh, ٢٠٠٢). There are two types of lipoproteins (low and high density lipoproteins) low density lipoproteins are responsible for segmentation cholesterol in the artery walls, and its concentration is associated with a higher risk of heart attack. High density lipoprotein concentration may play a beneficial role (Koo, *et al*. ١٩٨٥). Transport cholesterol from cells to the liver for reprocessing or bile acids formation (Hui, ١٩٩٢).

On contrary recent studies show serious health problems when feeding on some vegetable oils such as the famous corn oil.

Corn agronomists have developed high oil varieties; however, these varieties tend to show lower field yields, so they are not universally accepted by growers, Dupont, *et al.* (١٩٩٠).

Refined corn oil constituents are ٩٩٪ triglyceride, with proportions of approximately ٥٥٪ polyunsaturated fatty acid, ٣٠% monounsaturated fatty acid, and ١٥٪ saturated fatty acid. Of the saturated fatty acids, ٨٠٪ are palmitic acid (lipid number of C ١٦:٠), ١٤ % stearic acid (C ١٨:٠) and ٣٪ arachidic acid (C ٢٠:٠). Over ٩٩٪ of the monounsaturated fatty acids are oleic acid (C١٨:١c). ٩٨٪ of the polyunsaturated fatty acids are the omega-٦ linoleic acid (C١٨:٢ n-٦ c, c) with the ٢٪ remainder being the omega-٣ alpha-linolenic acid (C ١٨:٣ n-٣ c, c, c) (USDA, ٢٠٠٧).

Some medical researches suggest that excessive levels of omega- ٦ fatty acids, relative to omega -٣ fatty acids, may increase the probability of a number of diseases and depression .(lands, ٢٠٠٥ , Hibbeln ,*et al.,* ٢٠٠٦, and Okuyama *, et al*., ٢٠٠٧) . Modern Western diets typically have ratios of omega -٦ to omega-٣ in excess of ١٠ to ١ , some as high as ٣٠ to ١, partly due to corn oil which has an omega-٦ to omega -٣ ratio of ٤٩ : ١ . The optimal ratio is thought to be ٤:١ or lower (Daley, *et al*., ٢٠٠٤ and Simopoulos ٢٠٠٢).

Objective of the research: is to find the perfect way to feed the plant oils and fat without a negative impact effect on public health. Do not rely on certain class oil, but after studying its components and modify the components by mixing other oils to avoid negative impacts on health.

Down on the willingness of consumers to nutrition ghee because of its taste and flavor is good and beneficial effects on brain cells. So, the study was conducted to determine the means of proper nutrition ghee. Also, this study was interested with effects of buffalo ghee and olive oil upon Egyptian

blood lipid profile. So for none of the studies reported in Egypt to assess the effect of ghee on serum lipid profile of human.

MATERIALS AND METHODS

The experimental design was studied on human after announcing their relations according to sports activity, age's , and obesity.

Three independent variables at three levels as the reported design by Abdeen , *and Agag* (١٩٩٩) as follows:

١-Sport activity: (Avoid for physical activity, Irregular, and Viol regularly).by impact of a proposed training program for the development of the element of balance and stability during movement in the compulsory kata karate. The program includes a number of physical techniques and exercises to build muscles of the upper limb (forearm) for fist and lower limb (thigh) kicked, a skills necessary for a group that practiced karate on a regular basis, and subjected to a diet program, Faculty of Physical Education - University of Kafr- El-Sheikh.

٢- Age: (less than ٢٠, ٢٠– ٣٠ and more than ٣٠).

٣- Obesity: (Skinny, Medium, and Fleshy).

Table (١): The three variables at three levels variation, which experimental designed for human nutrition.

Variables	Variation			
	-١	٠	+١	Cod
Sport activity	**Avoid for physical activity**	**Irregular**	**Viol regularly**	**A**
Age	Less than ٢٠ years	٢٠- ٣٠ years	More than ٣٠ years	B
Obesity	Skinny	Medium	Fleshy	C

Table (٢): The out line of the experimental design.

	Test condition Variables														
Ex. No.	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠	١١	١٢	١٣	١٤	١٥
A	-١	+١	-١	+١	-١	+١	-١	+١	٠	٠	٠	٠	٠	٠	٠
B	-١	-١	+١	+١	٠	٠	٠	٠	-١	+١	-١	+١	٠	٠	٠
C	٠	٠	٠	٠	-١	-١	+١	+١	-١	-١	+١	+١	٠	٠	٠

Diet :

Main source of carbohydrate**:**

Macaroni (two times a week)

Rice (three times a week)

Bread (three times a day)

Main source of protein:

Chicken, eggs, milk and its products, meat, bean and lentils.

Main source of fat:

Olive oil as row was used to add to bean and dairy products .

The only variable was the olive oil and buffalo Ghee .

Vegetable and fruits were eaten twice a week..

Buffalo ghee was used in cooking and dipping .

Buffalo ghee and olive oil were purchased from department of animal farm Sakh and local supermarket, respectively.
Fasting venous blood samples (١٠ ml) were collected at the entry and the end of period.
The ٤٥ subjects ate: Their food with buffalo ghee or olive oil or mixed as the sole source of fat type for ٣ wk., as description of diet composition Table (٣).

Table (٣): Food consumption of subjects.

Dietary fat type	Variables			Energy Calorie	Carbohydrate		Fat		Protein	
	A	B	C		g	%	g	%	g	%
Olive oil	-١	-١	-١	١٨٠٠	٢٩٨	٦٦,٧	٥٠	٢٥	٤٠	٨,٨
	٠	٠	٠	١٩٨٠	٣٢٠	٦٤,٦	٦٠	٢٧,٢	٤٥	٩,١
	+١	+١	+١	٢٠٢٦	٣٥٠	٦٩,١	٦٢	٢٧,٩	٤٥	٨,٨
Buffalo ghee	-١	-١	-١	١٨٠٠	٢٩٠	٦٤,٤	٤٩	٢٤,٥	٤٠	٨,٨
	٠	٠	٠	١٩٨٠	٣٢٠	٦٤,٦	٦٠	٢٧,٢	٤٥	٩,١
	+١	+١	+١	٢٠٢٦	٣٣٠	٦٥,١	٦٢	٢٧,٥	٤٥	٨,٨
Blend	-١	-١	-١	١٨٠٠	٣١٠	٦٨,٨	٥٠	٢٥,٠	٤٠	٨,٨
	٠	٠	٠	١٩٨٠	٣٢٠	٦٤,٦	٦٠	٢٧,٢	٤٥	٩,٠
	+١	+١	+١	٢٠٢٦	٣٣٠	٦٥,١	٦٢	٢٧,٢	٤٥	٨,٨

Table (٣) for a description of diet composition. The basic diet was formulated to provide ٢٨٪ of food energy as fat. The actual range varied from ٢٥ to ٢٧,٩ energy % because subjects were varied.

The subjects were encouraged to maintain a constant body weighted and were weighted daily.

All food was provided for the subjects as three meals per day and was prepared in a local bakery. Subjects used check lists to keep daily records of all food eaten, including any occasional extramural food consumption. A staff member regularly verified with the subjects that these records were complete and accurate. In this way , the overall composition of the diet stayed constant, only the type of lipid used in food preparation was changed. Food intake study was noted that olive oil consumed by volunteers more than other oil or fat. It was used at least twice a day, consistently for breakfast and lunch, especially with chickpea and thyme and many times used for cooking.

Ghee used as delicious oil for cooking or stirs into rice and vegetables for a nourishing flavor some taste.

However, the period ٣wk was chosen as it had previously been shown that plasma lipid levels stabilized within ٢:٣ wk after initiating a change in dietary fat (Bonamon and Grundy, ١٩٨٨). Fasting venous blood samples (١٠ ml) were collected at the entry and the end of period for analysis.

Chemical analysis :

Preparation of the fatty acid methyl esters .

According to the procedure of Morrison and Smith (١٩٦٢) fatty acids composition of buffalo ghee and olive oil were saponified and the free fatty acids were methylated .

The methyl esters of olive oil and buffalo ghee was prepared using benzene,methanol and concentrated sulfuric acid (١٠ :٨٦ :٤) and methylation was carried out for one hour at ٨٠ -٩٠ ° C a according to Stahl (١٩٦٧)

Identification of fatty acids methyl esters:

Gas- liquid chromatography apparatus (Apye unicam model ٤٥٥٠) was used. The conditions were identical to those reported by Ishmael (١٩٨٩). Peak areas were measured using spectrophysic integrator .

Total cholesterol of ghee and olive oil were determined according to the method of Plummer (١٩٧٨).

Serum total cholesterol was determined using the enzymatic method at El – Resala Lab. Kafr El-Shiekh.

Triglycerides (TG) were determined by the enzymatic technique from El-Resala Lab. HDL-c was analyzed by the precipitation technique using magnesium chloride and phosphotungstic acid. LDL-c was calculated using the formula of Friedewald *et al.* (١٩٧٢).

RESULTS AND DISCUSSION

Saturated fatty acids (SFA), monounsaturated fatty acids (MUSFA), polyunsaturated fatty acids (PUSFA) and total cholesterol (TC).

The fatty acid profiles and total cholesterol content of olive oil and buffalo ghee in experimental food consumption are presented in Table (٤). The results showed that olive oil was free of cholesterol and short chains fatty acids (٤:١٥C) .While, buffalo ghee contained ١٨٠mg /dl and short chins fatty acids.

Ghee was rich in easy- to- digest short chain fatty acids. It also contained ٤,٥ % linoleic acid which had anti-oxidant properties . So, it is healthy cooking oil due to its content of essential fatty acids which are an essential part of our diets.

Ghee has a high smoke point which makes it great for cooking. It means, that it does not produce damaging free radicals .Elson (١٩٩٢) reported that besides that ghee contained appreciable amounts of short and medium chain fatty acids (FAS), these FAS may be an activator for hepatic hydroxyl-methyel-glutrate-coA reductase, the rate limiting enzyme in cholesterol biosynthesis.

Olive oil contained the higher MUSFA and PUSFA (٦٧,٢٪ -١٢, ٩ %), the lower SFA (١٩. ٨٪) than buffalo ghee. The ratio of PUSFA / SFA(P:s) and MUSFA +PUSFA (m + p) /s have been used by nutritionists to interpret the effect of dietary oil and fat on the level of blood cholesterol (Hodeson *et al.*, ٢٠٠١). The results also indicated that olive oil was higher in this parameter than ghee . As seen in Table (٥) The proximate analysis of the blood serum lipid concentrations of participants (TG,HDL-c, LDL-c and total cholesterol -TC) before starting of ٣ wk feeding are shown in this Table . The Table shows the health status of individuals based on experience after excluding the results according to the reference rang.

Table (٤): Fatty acid profile of buffalo ghee and olive oil used in the experimental.

Fatty acid	Buffalo ghee	Olive oil

٤،٦،٨;٠	٦,٦	----
١٠:٠	٦,٠	----
١٢:٠	٤,٢	----
١٤:٠	٨,٣	----
١٤:١	١,٣	----
١٤:٢	٠,٦	----
١٥:٠	٠,٣	----
١٦:٠	٢٤,٤	١٤,٦
١٦:١	٢,٨	٠,٧
١٦:٢	٠,٣	٠,٢
١٧:٠	١,١	----
١٨:٠	١٠,٣	٥,٢
١٨:١	٢٨,٢	٦٦,٥
١٨:٢	٤,٥	١٢,٠
١٨:٣	٠,٨	٠,٧
٢٠:٠	٠,٣	----
SFA% (S)	٦١,٥	١٩,٨
MUSFA% (M)	٣٢,٣	٦٧,٢
PUSFA% (P)	٦,٢	١٢,٩
P:S	٠,١٠	٠,٦٥
M + p / s	٠,٦٢	٤,٠٤
TC (mg / dl)	١٨٠,٠	----

Table (٥): Shows the results of the analysis for each of the blood TG, HDL-c, LDL-c and total cholesterol (TC) before beginning of the experimental .

Exp. No:	TG mg/dl			HDL-c mg/dl			LDL-c mg/dl			TC mg/dl		
References rang	٣٥-١٦٥			› ٤٦,٣٢			‹ ١٣٥,١			١٥٠-٢٠٠		
	O.O	Ghee	blend	O.O	Ghee	blend	O.O	Ghee	blend	O.O	Ghee	blend
١	٩٩	١٠٨	١٠٣	٥٠	٤٨	٥٢	١١٠	١٣٠	١٣٠	١٦٠	١٧٨	١٨٢
٢	٨٨	٦٨	١٠٦	٦٢	٤٩	٦٦	١١١	١٢٠	١٠٤	١٧٣	١٦٩	١٧٠
٣	٧٣	٦٩	٥٥	٥٦	٥٠	٧٣	١٠٩	١٢٣	٩٠	١٦٥	١٧٣	١٦٣
٤	٩٨	٦٩	٧٣	٧٤	٤٩	٦٢	١٠٦	١٢٢	٩٨	١٨٠	١٧١	١٦٠
٥	٨٠	٩٩	٨٢	٥٢	٤٧	٥٥	١٤٢	١٢٩	١٠٥	١٩٤	١٧٦	١٦٠
٦	٨٢	٧٠	٩١	٦٣	٤٨	٤٧	١٠٠	١٣٠	١٢٨	١٦٣	١٧٨	١٧٥
٧	٧٦	٧٨	٧٢	٤٩	٥٠	٥٦	١١٩	١٢٥	١١٢	١٦٨	١٧٥	١٦٨
٨	٨٨	٧٩	٧٦	٥٨	٥٣	٥٣	١٢٥	١٢٢	١٢٠	١٨٣	١٧٥	١٧٣
٩	٥٠	٩٨	٤٨	٦٢	٥٥	٦٤	١٠٩	١٠٩	١١٨	١٧١	١٦٤	١٨٢
١٠	٦٨	١٠٣	١٠٦	٧٤	٦٧	٧٢	٩٠	١٠٧	١١٥	١٦٤	١٧٤	١٨٧
١١	٩٤	١٠٠	١٠٣	٦١	٧٥	٨١	٩١	١٢٠	٩٩	١٥٢	١٩٥	١٩٠
١٢	٥٥	٩٩	٩٣	٧٣	٨٠	٨٣	٨٥	٨٨	٩٦	١٥٨	١٦٨	١٨١
١٣	٧٣	٧٧	٨٦	٨٢	٧٠	٧١	٩٧	١٠٥	٧٦	١٧٩	١٧٥	١٧٣
١٤	٨٢	١٠٢	٩٥	٨١	٦٨	٦٦	١٠٠	١١٥	٧٥	١٨١	١٨٣	١٧٥
١٥	٩٣	١٢١	١٠٠	٧٦	٦٠	٦٤	١١٧	١١٢	٧٣	١٩٣	١٧٢	١٩٠

Serum lipid response of the participants at starting and final of the ٣wk feeding of ghee are shown in Table (٦).

Ghee raised serum TC level a bout ٧,٣٪ in average and LDL-c level (+ ٧,٢٪) and caused an increase in HDL-c level about ٥,٨٪ in average above the initial levels. Among the variables (A, B, and D) Exp. No. ١ ,٥،٧,and ١٢ caused the highest raise in serum TC levels . These subjective as shown in Table (١ and ٢) avoid for physical activity , more than ٣٠ years , and fleshy .

Table (٦): Serum lipid responses (mg/dl) and % from the base line of variables after ٣ wk. fed dietary ghee.

Exp. No.	TG		HDL-c		LDL-c		TC	
	mg/dl%		mg/dl %		mg/dl%		mg/dl%	
١	-٣	-٢,٧	+٣	+٦.٢	+١٥	+١١,٥	+١٨	+٨,٥
٢	-١	-١,٤	+٤	+٨,١	+٥	+٤,١	+٩	+٥,٣
٣	-٣	-٤,٣	+٣	+٦,٠	+١٢	+٩,٧	+١٥	+٨,٦
٤	-٢	-٢,٨	+٤	+٨,١	+٦	+٤,٩	+١٠	+٥,٨
٥	-٣	-٣,٠	+٢	+٤,٢	+١٧	١٣,١+	+١٩	+١٠,٧
٦	-١	-١,٤	+٤	+٨,٣	+٤	+٣,١	+٨	+٤,٤
٧	-٣	-٣,٨	+٢	+٤,٠	+١٦	+١٢,٨	+١٨	+١٠,٢
٨	-٢	-٢,٥	+٣	+٥,٦	+٩	+٧,٣	+١٢	+٦,٨
٩	-١	-١,٠	+٤	+٧,٢	+٤	+٣,٦	+٨	+٤,٨
١٠	-١	-.٩٧	+٤	+٥,٩	+٥	+٤,٦	+٩	٥,١+
١١	-٢	-٢,٠	+٢	+٢,٦	+١٢	+١٠,٠	+١٤	+٧,١
١٢	-٣	-٣,٠	+٣	+٣,٧	+١٣	+٦,٩	+١٦	+٩,٥
١٣	-٢	-٢,٥	+٤	+٥,٧	+٦	+٥,٧	+١٠	+٥,٧
١٤	-٢	-١,٩	+٤	+٥,٨	+٧	+٦,٠	+١١	+٦,٠
١٥	-٢	-١,٦	+٤	+٦,٦	+٦	+٥,٣	+١٠	+٥,٨

On the contrary Exp. No. (٢،٤،٦،٩،١٠،١٣،١٤, and ١٥) showed the lowest raise in serum TC levels . These subjects as shown in Table (٢) are viol regularly sports, young , and skinny or medium . In general , serum cholesterol levels tended to be low reference value (١٥٠ :٢٠٠ mg/dl) in all experimental .

Also, the results showed that reduction TG in all Exp. Subject .

If all standards of nutrition on ghee raise the proportion of total cholesterol and reduce the rate ruling on triglyceride. It was noted the increase in total cholesterol as a result of feeding ghee to the extent permitted and the increase in HDL-c in groups that viol regularly sports and small-and medium-Age Forums . Many nutrients other than dietary fat influence cholesterol concentrations such as low cholesterol concentration, dietary fiber, complex carbohydrate intake and protein source (Cohen *et al.,* ١٩٩٤).

As expected, it was noted increase of the proportion of total cholesterol in general as a result of feeding ghee. However, high cholesterol for each of the sports practice, young and slim due to the increase in HDL-c. Returns while increasing the proportion of total cholesterol for each of the Sport and shall not perform advanced in age and fat due to an increase in LDL-c . Elson (١٩٩٢) reported that besides that ghee contained an appreciable amount of short and medium chain fatty acids (FAS), these FAS may be work as an

activator for hepatic hydroxyl-methyel-glutrate-coA reductase, the rate limiting enzyme in cholesterol biosynthesis. Short chain FAS with two other FAS namely, lauric and myristic acids were thought as hypercholesterolenic agents. Ide *et al* . (١٩٧٩) completed that and may be cause high rate of cholesterol absorption. Hajji *et al*.(١٩٩٨) reported that myristic acid appeared to be the most potent cholesterol rising in human. Also, the cholesterol content of ghee may be increased blood cholesterol concentration (Gurr, ١٩٨٩).

The results showed that a great reduction in the concentrating of serum total cholesterol, HDL-c and LDL-c and these reduction may be due to high MUSFA (٦٧,٢) oleic acid content in olive oil .

Polyphenolic compounds found in olive oil may be contributed to the lower incidence of coronary heart disease. Recent findings demonstrate that olive oil phenolics inhibit oxidation of LDL-c (Visioli and Galli, ١٩٩٩) .

Garg, (١٩٩٤) reported that olive oil for routine frying or cooking practices, that is it did not produce toxic aldehyde.

Table (٧): Serum lipid responses (mg/dl) and % from the base line of variables after ٣ wk. fed dietary olive oil.

Exp .No.	TG		HDL-c		LDL-c		TC	
	mg/dl%		mg/dl%		mg/dl%		mg/dl%	
١	+٥	+٤,٦	-٣	-٢,٣	-٦	١٢,٥-	-٩	٥,٠-
٢	+٣	+٤,٤	١-	٠,٨-	٣-	٦,١-	٤-	٣,٢-
٣	+٤	+٥,٩	٣-	٢,٤-	٦-	١٢,٢-	٩-	٥,٢-
٤	+٣	+٤,٣	٣-	٢,٤-	٥-	١٠,٢-	٨-	٤,٦-
٥	+٥	+٥,٠	٣-	٢,٣-	٥-	١٠,٦-	٩-	٥,١-
٦	+٣	+٤,٢	١-	٠,٧-	٣-	٦,٢-	٤-	٢,٢-
٧	+٥	+٦,٤	٣-	٢,٤-	٦-	١٢-	٩-	٥.١-
٨	+٤	+٥,٠	٢-	١,٦-	٥-	٩,٤-	٧-	٤,٠-
٩	+٣	+٣,٠	٢-	١,٨-	٤-	٧,٢-	٦-	٣,٦-
١٠	+٣	+٢,٩	١-	٠,٩-	٣-	٤,٤-	٤-	٢,٢-
١١	+٤	+٤,٠	٢-	١,٦-	٣-	٤,٠-	٥-	٢,٥-
١٢	+٥	+٥,٠	٢-	٢,٢-	٧-	٨,٧-	٩-	٥,٣-
١٣	+٣	+٣,٨	١-	٠,٩-	٣-	٤,٢-	٤-	٢,٢-
١٤	+٣	+٢,٧	١-	٠,٨	٣-	٤.٤-	٤-	٢,١-
١٥	+٣	+٢,٤	-١	٠,٨	٣-	٥,٠-	٤-	٢,٣-

Olive oil consumption lowered levels of serum total cholesterol (-٣,٦٤ %), LDL-c (-٧,٨%) and caused slight reduction in HDL-c (-١,٩%) on average, under the initial level. On the contrary , olive oil raised TG (+٣,٧%) on average. Among the variables (A, B, and C), Exp. No. ٦, ١٠, ١١, ١٣, ١٤ and ١٥ serum TC level was decreased. These subjects as shown in Table (١-٢) are viol regularly sports, young, and skinny or medium. Whereas, Exp. No. ١, ٣, ٤, ٥،٧and٨ showed the highest level of serum TC. The results showed that olive oil caused reduction in the concentration of serum TC, LDL-C and HDL-C and this reduction may be due to high oleic acid content ٦,٦٪ in olive oil. Also polyphenolic compounds found in olive oil may be contributed to the lower incidence of coronary heart disease in this area, (Rawashdeh, ٢٠٠٢). Visioli and Galli (١٩٩٩) demonstrated that olive oil phenolics inhibit oxidation

of low-density lipoproteins. Garg,(١٩٩٤)reported that olive oil can be advised as an alternative to high –carbohydrate diets in diabetic and carbohydrate-sensitive patients. Also Grooviest, (١٩٩٨) reported that olive oil did not produce toxic aldhydes during routine frying or cooking practices. Generally, olive oil feeding decrease TC, HDL-c, LDL-c and increase TG.

The presence of a high level of this fat (TG) especially with the presence of a low level of high density lipoprotein HDL-c in the blood that looks like a tremor of injury of heart disease, although it is not the same force, such as high cholesterol level, (Lands, ٢٠٠٥).

Table (٨): Serum lipid responses (mg/dl) and % from the base line of variables after fed dietary blend of ghee and olive oil.

Exp. No.	TG		HDL-c		LDL-c		TC	
	mg/dl%		mg/dl %		mg/dl%		mg/dl %	
١	+٢	+١,٨	+١	+٠,٧٦	+٢	+٤,١	+٣	+١,٧
٢	-	-	-	-		-	-	٠
٣	+٣	+٤,٣	+٢	+١,٦	+٢	+٤,٠	+٤	٢,٣+
٤	-	-	-	-	-	-	-	٠
٥	+٢	+٢,٠	+١	+٠,٧٧	+١	+٢	+٢	١,١+
٦	-	-	-	-	-	-	-	٠
٧	+٢	+٢,٥	+٢	+١,٦	+١	+٢,٠	+٣	+١,٧
٨	-	-	-	-	-	-	-	٠
٩	+١	+١,٠	+٢	+١,٨	+١	+١,٨	+٣	+١,٨
١٠	+١	+٩,٠	+٢	+١,٨	+١	+١,٤	+٣	+١,٧
١١	+١	+١,٠	+١	+٠,٨	+١	+١,٣	+٢	+١.٠
١٢	+١	+١,٠	+١	+١,١	+١	+١,٢	+٢	+١,٢
١٣	+١	+١,٢	-	-	-	-	-	٠
١٤	+١	+٠,٩	-	-	-	-	-	٠
١٥	+١	+٠,٨	-	-	-	-	-	٠

It was shown that no change in serum TG, HDL-c, LDL-c and TC in EXP.NO. (٢, ٤, ٦, and٨) when blended ghee with olive oil was used . Also, EXP. NO. (١٣, ١٤, and١٥). A slight increase was shown in this parameter in the residual EXP.

Some studies showed that diets high in PUSFA can lower serum HDL-c concentration (Hajji *et, al.,* ١٩٩٨ and Hodson*, et, al*., ٢٠٠١). This means that blend olive oil (PUSFA and MUSFA) with ghee (SFA) resulted a slight increase in serum parameter. The human body is ٨٠٪ of the requirements of the cholesterol in the liver and the remaining ٢٠٪ has to be dealt with sources of food for foreign affairs. (Garg, ١٩٩٤).

The distained data suggest that this may not be absolutely necessary avoid ghee for those who are suffering heart diseases.

Finally: Olive oil which is high oleic acid, with ghee may be a good alternative of dietary fat for reducing blood cholesterol level.

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تأثير التغذية البشرية من خلال وجبات تحتوي على السمن وزيت الزيتون ومزيج من هذه الدهون على الكولسترول في الدم.

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تم إجراء هذا البحث بغرض عدم توفر كمية الذرة الكافية للحصول على زيت الذرة النقي المتواجد بكمية كبيرة بالأسواق. والسبب أن وزن الجنين يمثل ٤% من وزن حبة الذرة كما أن نسبة الزيت في جنين الذرة ٢٥:٢٧ % من وزن الجنين. لذا يلزم طن ذرة للحصول على ١٠ كجم زيت إذا كان الاستخلاص ١٠٠% وهذا مستحيل . كما أظهرت دراسات لبعض الباحثين أن زيت الذرة وزيوت صناعية أخرى تنمى خلايا سرطان البروستاتة وزيادة معدلات الوفاة .

كذلك رغبة جمهور المستهلكين على التغذية بالسمن لما لها من مذاق ونكهة مميزة وأثار حميدة على خلايا المخ وتخوفهم في نفس الوقت من ارتفاع نسبة الكولسترول في الدم .

حيث أجريت تجارب تغذية إنسان على وجبات بالسمن البلدي وأخرى بزيت الزيتون كلا على انفراد وخليط منهم .

تم تحليل للأحماض الدهنية المتواجدة بزيت الزيتون والسمن الجاموسى وتم وضع تصميم للتجارب على أساس ثلاثة متغيرات وكل متغير على ثلاثة مستويات كاالأتى :

١- ممارسة النشاط الرياضي على مستويات ثلاثة (لا يمارس أي نشاط – يمارس دون انتظام – يمارس بانتظام) بواسطة برنامج تدريبي مقترح لتنمية عنصر التوازن أثناء الثبات والحركة في الكاتا الإجبارية لرياضة الكاراتيه . ويتضمن البرنامج أساليب الأعداد البدني والتمارين اللازمة لبناء عضلات الطرف العلوي (الساعد) للكم والطرف السفلى (الفخذ) للركل. والمهارات اللازمة للمجموعة التي تمارس رياضة الكاراتيه بانتظام. وإخضاعهم لبرنامج غذائي بكلية التربية الرياضية – جامعة كفر الشيخ .

٢- الفئة العمرية ومستوياتها (أقل من ٢٠ سنة – من ٢٠ : ٣٠ سنة – أكثر من ٣٠ سنة) .

٣- السمنة ومستوياتها (نحيف – متوسط – سمين).

كما تم سحب عينة دم من كل الأفراد المشاركة في التجربة قبل بدء التجارب وتقدير الجلسريدات الثلاثية (TG) والليبوبروتين منخفض (LDL-c) وعالي(HDL-c) الكثافة والكولسترول الكلى (TC) واستبعاد العينات الغير مطابقة (Reference range) .

أجريت التغذية لمدة ثلاثة أسابيع متتالية ثم تم سحب عينة دم وأخرى بعد التغذية بأسبوع. وحساب المتوسطات لكل من HDL-c, LDL-c, TG ، TC . وأتضح الأتي :

لا يحتوى زيت الزيتون على أحماض دهنية قصيرة السلسلة حتى كربون ١٥ مقارنة بالسمن البلدي الذي يبدأ بكربون ٤.

وجد أن التغذية بوجبات تحتوى على السمن ترفع نسبة الكولسترول حوالي ٧%وتخفض الجلسريدات الثلاثية .وأن ممارسة أنشطة رياضية والفئة العمرية أقل من ٢٠ سنة والمتوسطة الوزن أقل تأثير من غيرها

كما وجد أن التغذية بوجبات تحتوى على زيت الزيتون تخفض نسبة الكولسترول بما فيها الكولسترول عالي الكثافة وترفع من نسبة الجلسريدات الثلاثية وقد يكون ذلك أيضا خطر على الصحة العامة وقد تلاحظ أن ممارسة النشاط الرياضي يقلل من الجلسريدات الثلاثية ويخفض نسبة الكولسترول وخاصة المنخفض الكثافة

وبالنسبة للتغذية على الوجبات التي تحتوى على خليط من السمن وزيت الزيتون تلاحظ أنة لا يوجد تغير يذكر سيان في مستوى الكولسترول أو الجلسريدات الثلاثية للأفراد التي تزاول أنشطة رياضية. وعلى هذا الأساس تعتبر التغذية بخليط من السمن وزيت الزيتون تغذية صحية آمنة لتفادى الإصابة بأمراض الأوعية والقلب والشرايين . وخصوصا عند ممارسة النشاط الرياضي لبناء كتل من العضلات والتغلب على السمنة الزائدة.

ننصح بدراسة جيدة للزيوت النباتية عموما لبيان النسب بين أوميجا -٦ وأوميجا-٣ وتعديلها عن طريق خلط الزيوت النباتية ببعضها لتصبح النسبة بين أوميجا -٦ : اوميجا-٣ هي ٤ : ١ أي الخلط بغرض تعديل النسب لتفادى الإصابة بالسرطان.

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