



Estimation of Cholesterol Content in Some Commercial Edible Refined Sunflower -Brand Oils in Mumbai, Maharashtra

KEYWORDS

cholesterol, Sunflower, oil, phytosterols

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ABSTRACT *The 12 samples of oils of Refined Sunflower -Brands were purchased from local market from Mumbai city from September, 2011 to, December 2011. The packed propylene bags, were stored at - 20 °C in deep freezer in the Department of Zoology, S.S & L.S. Patkar College, Goregaon (West) Mumbai for further analysis. The present study was carried out to estimate the sterol content and degree of un-saturation of fatty acid in edible Refined Sunflower oils. In the present scenario of nutrition science, the role of fats and oils in human nutrition and their health is found to be very effective. It is now also known that fats and oils besides their earlier recognized role as conventional nutrient as energy provider, may also play an efficient and competent role in immune responses by decreasing dietary total fat intake with the inclusion of higher amounts of phytosterols such as sitosterol and also moderate amounts of poly unsaturated fatty acids with adequate antioxidant nutrients. The result shows that the degree of unsaturation was higher in plant oils in comparison to animal fat and among all plant Refined Sunflower oil had highest degree of unsaturation. Higher degree of unsaturation of oils is good for the human health. So, apart from all the above discussion the conclusion was made that plant oils are good for consumption as it contains unsaturated fatty acids as well as plant oils are rich in phytosterol i.e. sitosterol, which lowers the cholesterol absorption in human beings.*

INTRODUCTION

The heart diseases are increasing day by day and the heart attack is a major cause of death world over. There are several reasons for heart diseases but one of the most important reason is hypercholesterolemia. The blood stream carries cholesterol in particles called lipoproteins. But too much circulating cholesterol injures arteries especially coronary arteries. Almost every adult at present times develops some degrees of atherosclerosis, commonly known as "hardening of the arteries". Atherosclerosis leads to strokes, heart attacks and other serious health problems. High cholesterol is associated with, smoking and high blood pressure are the principal risk factors linked to heart disease. This leads to accumulation of cholesterol-laden "plaques" in vessel linings, a condition called as Artherosclerosis.

Oils are naturally occurring esters of long straight-chain carboxylic acids. They belong to the saponifiable group (contain an ester groups) of lipids. Lipids are biologically produced materials that are relatively insoluble in water but soluble in polar and non-polar organic solvents. Edible oils are constituted of triacylglycerol molecules, mainly formed by unsaturated (oleic, linoleic, linolenic acids etc.) and saturated fatty acids (myristic, palmitic, stearic acids etc.) esterified to Glycerol units (Andersson et al., 2010). Oils have always been an integral part of human foods, being essential for health. Industrially, they play an important role in the development of different areas of chemical products, pharmaceutical, cosmetics, paints and most importantly, food (Atef, 2010).

The word "cholesterol" may quickly be associated with chronic heart disease & other heart problems. However cholesterol also has essential functions in the body such as

providing essential components of membrane and serving as a precursor of bile acids, steroid hormones and vitamin D. Cholesterol is a structure containing 27 carbon, commonly found as the component in cell membrane. Biologically it is an important precursor for bile acid, provitamin D3 and several steroidal hormones. Accurate determination of cholesterol is important due to its close correlation to the occurrence of coronary heart disease (Sweeney, J. & Weihrauch, J. 1976).

Public, Patients and doctors are better informed about the risk associated with the elevated level of cholesterol, benefits of life style changes and medical measures aimed at lowering cholesterol (Henkel, 1998). The results from all clinical trails show that a one percent reduction in total cholesterol shows a two percent reduction in heart attack (NIH report 1988). Reduction of blood cholesterol by the administration of the drugs or by the modification of diet decreases the risk of coronary artery diseases. Thus, it is useful to identify and limit foods that are rich in cholesterol.

In Pakistan the heart disease has become one of the most fatal diseases to cause death and its percentage below 40 years population is 20% (1 in 5 people) (Khan, 1988). Heart disease is a number one killer of both men and women in America. More than 90 million American adults have elevated blood cholesterol level. Heart disease deaths have declined steadily over the last 30 years. Indeed between 1990 and 1994 heart disease deaths have decreased by 10.3%. A key factor in this drop is that the public, patients and doctors are better informed about the risk associated with elevated cholesterol, benefits of life style changes and medical measures aimed at lowering cholesterol (Henkel, 1998).

MATERIALS AND METHODS**a) Sample Collection**

The 12 samples of oils of different brands purchased from local market from Mumbai city from September, 2011 to, December 2011. The oils of different brands were, packed in propylene bags, were stored at - 20 °C in deep freezer in the Department of Zoology, S.S & L.S. Patkar College, Goregaon (West) Mumbai for further analysis.

Samples were weighed to 1 gm, dissolved in chloroform to 10 ml and further diluted to 10 times (10,000 ppm). 3ml of diluted sample solution were mixed with 2ml of Liberman-Burchard reagent and 2 ml of chloroform. The tubes were covered with black carbon paper and kept in ice bucket in dark place for 15 min. Liberman-Burchard reagent react with the sterol to produced characteristic green color, their absorbance were determined on spectrophotometer at 550 nm

b) Standard Cholesterol Solution:

10 mg of standard cholesterol dissolved in 10 ml chloroform.

c) Liberman- Burchard reagent:

0.5 ml of sulfuric acid dissolved in 10 ml of acetic anhydride. Covered and kept in ice bucket.

d) Instrument:

Digital Spectrophotometer Model No. EQUIP-TRONICS No- EQ 820 at λ_{max} 550 nm

e) Chemicals:

Cholesterol standard was parches from (Bombay Research Lab, Poona), Liberman-Burchard reagent (Acetic anhydride & Sulphuric acid), Chloroform

Analysis and tabulation of the Data- On the basis of observation, readings test were taken and then calculations were made and have been presented as results in the form of tables. Tabulation of data was done by calculating the result with the help of observed readings. The formula used in the calculations is given below.

$$\text{Sterol Content Calculation} = \frac{\text{O.D. of Sample}}{\text{O.D. of Standard}} \times n$$

O.D. of Sample = Optical density of sample at 550 nm.

O.D. of standard = Optical density of standard at 550 nm.

Where, n = 20 mg/dl. = standard concentration.

RESULTS AND DISCUSSION:

Table 1. : Table showing the cholesterol content in some commercial edible Refined Sunflower -Brand oils in Mumbai, Maharashtra

Sr.No	Refined Sunflower -Brands	Observed Optical Density at 550 nm	Calculate Value (mg/gm.)
1	Aadhar	0.26	43.333
2	Dhara Health	0.22	36.667
3	Fortune Plus	0.24	40.000
4	Fortune Sunlite	0.23	38.33
5	Gemini A,D,G,E	0.34	56.667
6	Gemini Nutri-V	0.25	41.667
7	Godrej Cooklite	0.23	38.33

8	Gulab Sun-gold	0.32	53.33
9	Kamani Komal	0.28	46.667
10	Sunrich Ruchi	0.23	38.33
11	Sundrop Super	0.24	40.000
12	Sweekar	0.23	38.33
13	Standard Cholesterol	0.12	---

The present investigation is an overview of how food choices can affect one's cholesterol level. Every animal cell, both human and nonhuman, contains cholesterol. There is no need to consume cholesterol in diet, blood cholesterol levels are affected by many factors. Population groups with an average cholesterol level of 150 mg/dl or less are largely free of atherosclerosis. For cholesterol level above 150 mg, the risk of heart disease increases (Anonymous, 1978). Cholesterol in food increases the level of LDLs (Johnson and Greenland, 1990). One study shows that people who adopt a vegetarian diet reduce their fat intake by 26% and achieve a significant drop in cholesterol levels in just six weeks (Maseri et al, 1984). Beside the very low level of fat eaten in a typical vegetarian diet, vegetables proteins also helps decrease risk of heart attack.

The Sabir, et. al. (1993) evaluated the butter fat and also shows highest amount of phyto-sterol present in mustard oil in comparison to other plant oils. The present observation given in the Table is supported by a study carried by the Sabir, et al., (1993) in which he stated that the butter contains 27 mg/gm. Cholesterol and mustard oil contains the highest amount of phytosterol i.e. 64 mg/gm. The work carried by Shukla et al., (2002), showed that in vegetable oils, like Camelina oil contains 200 mg/kg cholesterol. Furthermore, cholesterol has been detected as one of the major sterol in surface lipids of higher plants especially in the leaves of rape (Noda et al., 1988). Studies have carried by (Carrol et al., 1984) shown that replacing animal protein with Soy protein reduce blood cholesterol levels even when the total amount of fat and saturated fat remain the same. Besides the very low level of fat eaten in a typical vegetarian diet, vegetable proteins also helps decrease risk of heart attack. Our findings from this study supports previous work carried out by the above researchers. Table 1 shows a level of cholesterol in all the edible Refined Sunflower -Brand oils collected from the markets in Mumbai, Maharashtra, showed quite similar trends to the Sabir's et al., (1993) observations with our present study.

CONCLUSION

The present study was carried out to estimate the sterol content and degree of un-saturation of fatty acid in edible oils. In the present scenario of nutrition science, the role of fats and oils in human nutrition and their health is found to be very effective. It is now also known that fats and oils besides their earlier recognized role as conventional nutrient as energy provider, may also play on efficient and competent role in immune responses by decreasing dietary total fat intake with the inclusion of higher amounts of phytosterols such as sitosterol and also moderate amounts of poly unsaturated fatty acids with adequate antioxidant nutrients. The result shows that the degree of unsaturation was higher in plant oils in comparison to animal fat. And among all plant oils sunflower oil had highest degree of unsaturation. Higher degree of unsaturation of oils is good for the human health. So, apart from all the above discussion the conclusion was made that plant oils are good for consumption as it contains unsaturated fatty acids as well as plant oils are rich in phytosterol i.e. sitosterol, which lowers the cholesterol absorption in human beings.

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