Apple consumption reduces serum triglyceride in men subjects

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Abstract

This study clarified the effect of apple supplementation on lipid profile in the serum. Two types of diet after fasting were applied to 20 men. They were once a day for two weeks for each type of diet. The range weight of these persons was 85.3 ± 3.1 Kg and the range age was 36.2 ± 2.6.The first type of diet was applied to the control, where the persons consumed 50 gm of cream, 100 gm of bread, and one teacup in diet. The second type of diet was applied to the same persons after the end of the two weeks of first type immediately and continued for two week, as well. The second diet (an apple serving) included the consumption of a yellow apple weighing about 100 gm, 50 gm cream, 100 gm bread, and one teacup. At the end of 2 weeks for each kind of diet, the blood samples were taken; at the 0.0 time (just before serving), after half an hour, after one hour, and after 2 hours from the serving. Triglyceride (TC), Low-density lipoprotein (LDL), High-density lipoprotein (HDL) and Very-low density (VLDL) concentrations were measured. Standard T –test (paired) at $p < 0.01$ was used to show statistical significant differences. TG concentrations significantly decreased ($p<0.01$) compared to 0.0 hr and the control. The effect of the apple may be related to a combination of apple pectin and apple phenolic fractions, which lowered the triglycerides by inhibiting the secretion of intestinal lipoproteins. Thus the triglycerides decreased.

Introduction

Since fruits and vegetables are high in antioxidants, a diet rich in these foods should help prevent oxidative stress and may help prevent chronic disease, plus slow down aging. Based on these findings, the National Research Council recommends consuming five or more servings of fruits and vegetables a day. Several commonly consumed foods and beverages, including tea, onions, cocoa, cranberries, and apples, have been targeted as particularly beneficial in the diet because of their high content of phenolic compounds [1]. In numerous epidemiological studies, apples have been associated with a decreased risk of chronic diseases such as cardiovascular disease, cancer, and asthma.

In vitro and animal studies have demonstrated that apples have high antioxidant activity, can inhibit cancer cell proliferation, decrease lipid oxidation, and lower cholesterol, potentially explaining their role in reducing the risk of chronic disease [2, 3, 4, 5].

Apples contain a wide variety of phytochemicals, many of which have been found to have strong antioxidant activity and anticancer activity. The interaction of the

many apple phytochemicals warrants more study as researchers attempt to further explain the mechanism behind the apple's ability to reduce the risk of chronic disease [6].Many factors affect apples' phytochemical profile and are important to consider as one attempts to understand and maximize their health benefits. The phytochemical composition of apples varies greatly between different varieties of apples, and there are small changes in phytochemicals during the maturation and ripening of the fruit. In general, storage of apples does not seem to greatly affect apple phytochemicals [7]. However, the processing of apples for juice results in a very significant decrease in phenolics. Processed apple peels retain their phenolic and flavonoid compound activity and thus may be used as a value-added ingredient with potent antioxidant activity. In short, apples exhibit many potential health benefits. Regular consumption of fruits and vegetables, especially apples, as part of a healthy diet seems to aid in the prevention of chronic disease and maintenance of good health [8].Some of the apple's protective effect against cardiovascular disease may come from its potential cholesterol-lowering ability. Aprikian with his group found that when cholesterol fed rats were supplemented with lyophilized apples; there was a significant drop in plasma cholesterol and liver cholesterols and an increase in high-density lipoproteins (HDL). Furthermore, they found that cholesterol excretion increased in the faeces of rats fed apples. In a second study, a similar cholesterol lowering effect was seen in cholesterol fed rats when rats were fed apples, pears, and peaches. Apples had a greater cholesterol lowering affect than the other two fruits. The three fruits also increased the plasma antioxidant potential, with apple having the greatest effect [9]. In obese Zucker rats, apple consumption lowered cholesterol and low-density lipoproteins (LDL), however in lean rats, apple consumption did not change cholesterol levels [10]. In rats supplemented with cholesterol, apple pomace fiber and sugar beet fiber, the plasma lipids were significantly lower than in rats without the dietary fiber [11]. Rats fed sugar beet pulp fiber and apple pomace fiber, but not fed cholesterol, had no change in lipids. The sugar beet pulp fiber and the apple pomace fiber did not have an effect of lipid peroxides [12]. The aim of the present work is to investigate the effect of apple on lipoproteins.

Materials and Methods

Design of the study:

Two ways of diet after fasting were applied on 20 male persons per day for 2 weeks for each way of diet. The average weight of these persons was 85.3 ± 3.1 Kg and average age was 36.2 ± 2.6 .The first way of diet was applied on control serving which the persons consumed 50 gm cream , 100 gm bread , a one teacup in diet. The second way of diet was applied on the same persons after the end of the two weeks of first way of diet immediately and continues for two weeks also. The second way of diet (an apple serving) was included consumption of yellow apple weighing about 100 gm, 50 gm cream, 100 gm bread, a one teacup. At the end of 2 weeks for each way of diet the blood samples were taken; At the 0.0 time (just before serving), after half hour, after one hour and after 2 hours from the serving. TC, LDL, TG HDL and VLDL concentrations were measured.

Biochemical Analysis:

Total cholesterol concentration in serum, triglycerides concentration in serum HDL concentration in serum, LDL concentration in serum and glucose concentration in serum were measured using enzyme colorimetric methods by using Spectrophotometer. Commercially available kits (Biolabo SA , France) were used. The samples had been collected from students of faculty of health and science in Koya University and were tested in their laboratory.

Statistical analysis:

T –test at $p < 0.01$ used for statistical significant differences.

Results and Discussion

Serum lipid and serum glucose values in 20 normal persons are presented in table 1and table 2. The tables showed significant decreasing ($p < 0.01$) of triglyceride at the half hour, a one hour, two hours after consumption the apple compare to the 0: 0 time also compare to the control group at these time. Averages of rest lipid profiles did not change in both groups because consumption of apple for long time ((months)) may leads to these results. The decreasing effect of apple upon triglyceride may comes from combined apple pectin and apple phenolic fractions which lowered plasma and liver cholesterol, triglycerides, and apparent cholesterol absorption to a much greater extent [13]. There is a beneficial interaction between fruit fibre and poly phenolic components and also supports the benefits of eating whole fruits as opposed to dietary supplements [14]. In a study [15], a daily intake of 600 mg apple poly phenol extract caused a significant decrease of serum TC and LDL-C22 a 300-gram golden apple used in Nagasako study contain 145.5 poly phenol, so the 600 polyphenol extract equals 1200 g golden apple, which is 4 times more than the amount that has been used in our study. [16] Suggested that food containing flavonoids can total plasma antioxidant capacity increase. Also marked the highest antioxidant effects is related poly phenols in the food [17, 18]. In addition to Apple previously mentioned materials, components as is found Procianidin have shown that this material is able to reduce blood lipids [19]. [19] Showed that the existing Procianidin apples inhibit ester synthesis and lipoprotein secretion is inhibited. They also reported that apple polyphenol inhibits the secretion of intestinal lipoproteins, Thus cholesterol, triglyceride and LDL decreased because these results will get after long period from consumption of apple. In human studies about the effects of apples on lipids and lipoproteins has been done. So that in a controlled study, two strains uninformed, which was 4 weeks, showed that consumption of fruits such as apples can significantly reduce the amount of cholesterol in the human. The amount of LDL and HDL were increased and decreased, but these changes are not meaningful [20]. Has been shown that 20-25% of daily needs body poly phenols and 10-30% of the daily fiber your body needs is allocated to the apple in communities [21, 22, 8, 23].

Conclusions:

Apple consumption is good for reduction of serum triglyceride which helps to prevent obesity.

Table (1): Averages of serum total cholesterol (mg/dl) in blood serum for non apple consumed persons (control) and apple consumed persons.

Time	Control	Apple consumption
٠.٠	165.2 ± 11.5	160.4± 14.6
0.5 hr	166.5 ± 10.1	162.7± 10.6
1 hr	167.4 ± 12.7	159.3± 11.9
2 hr	165.8 ±9.9	159.1± 9.5

T –test at $p < 0.01$

* average is significant different from the normal average

Average weight = 85.3 ± 3.1 Kg and average age = 36.2 ± ٢.٦ of the persons

Table (2): Averages of triglyceride(mg/dl) in blood serum for non apple consumed persons (control) and apple consumed persons.

Time	Control	Apple consumption
٠.٠	87.5 ± 5.1	90.3 ± 4.8
0.5 hr	88.0 ± 6.1	66.5 ± 5.8 * ¤
1 hr	91.1 ± 7.7	٦٧.1 ± 4.3 * ¤
2 hr	93.2 ± 7.3	70.5 ± 4.7 * ¤

T –test at $p < 0.01$

* average is significant different from the 0.0 time in same group

¤ average is significant different with control group at the same time

average weight = 85.3 ± 3.1 Kg and average age = 36.2 ± 2.6 of the persons, number of the persons = 20

Table (3): Averages of VLDL (very low density lipoprotein) (mg/dl) in blood serum for non apple consumed persons (control) and apple consumed persons.

Time	Control	Apple consumption
٠.٠	17.5 ± 2.3	18.1 ± 2.3
0.5 hr	17.6 ± 1.9	13.3 ±1.3
1 hr	18.2 ± 2.5	13.4 ± 1.5
2 hr	18.6±2.7	14.1 ± 1.4

T –test at $p < 0.01$
average weight = 85.3 ± 3.1 Kg and average age = 36.2 ± 2.6 of the persons
number of the persons = 20

Table (4): Averages of HDL(High density lipoprotein) (mg/dl) in blood serum for non apple consumed persons (control) and apple consumed persons.

Time	Control	Apple consumption
٠.٠	58.3± 5.1	60.3±4.8
0.5 hr	55.2± 4.4	62.1± 5.8
1 hr	54.5±3.9	63.4 ± 4.5
2 hr	56.4±4.2	65.5± 5.0

T –test at $p < 0.01$
average weight = 85.3 ± 3.1 Kg and average age = 36.2 ± 2.6 of the persons
number of the persons = 20

Table (5): Averages of LDL (Low density lipoprotein) (mg/dl) in blood serum for non apple consumed persons (control) and apple consumed persons.

Time	Control	Apple consumption
٠.٠	89.4 ± 8.1	82.0±7.8
0.5 hr	93.7 ± 7.9	87.3 ± 8.5
1 hr	94.7 ± 9.6	82.5 ± 7.5
2 hr	90.8 ± 8.8	79.5 ± 6.1

T –test at $p < 0.01$
average weight = 85.3 ± 3.1 Kg and average age = 36.2 ± 2.6 of the persons
number of the persons = 20

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علاقة بين تناول التفاح و انماط الدهون

الملخص

هذه الدراسة توضح تأثير تناول التفاح على مستويات الدهون في الدم. تم تطبيق طريقتين من النظام الغذائي بعد صيام ٢٠ عينة ذكر يوميا لمدة ٢ أسابيع لكل طريقة من النظام الغذائي. وكان متوسط وزن هذه عينات ٣،٨٥ ± ٣.١ كجم ومتوسط العمر ٢،٣٦ ± كان ٢.٦. تم تطبيق الطريقة الأولى من النظام الغذائي التحكم على تناول ٥٠ جرام كريم، ١٠٠ جرام خبز، فنجان شاي واحد التي تستهلك المواد في النظام الغذائي. تم تطبيق الطريقة الثانية من النظام الغذائي على نفس المواضيع بعد نهاية الأسبوعين من الطريقة الأولى من النظام الغذائي على الفور وتستمر لمدة أسبوعين أيضا. تم تضمين الطريقة الثانية من النظام الغذائي (وهي تناول التفاح) التفاح الأصفر تزن حوالي ١٠٠ جرام، كريم جم ٥٠، ١٠٠ جرام خبز، فنجان شاي واحد. في نهاية ٢ أسابيع لكل طريقة من النظام الغذائي أخذ عينات من الدم، وفي الوقت ٠.٠ (فقط قبل ان التناول)، وبعد نصف ساعة، بعد ساعة واحدة وبعد ٢ ساعة من الوجبة. تم قياسTC ، LDL، HDL TG وتركيزات VLDL استخدم الاختبارT في مستوى P- <0.01 لفروق ذات دلالة إحصائية. انخفضت تركيزات TG بشكل ملحوظ (p <٠.٠١) مقارنة إلى معاملة ٠.٠ ساعة. تأثير التفاح قد تكون سبب ارتباط البكتين في التفاح مع الفينولات الموجودة في التفاح و التي ادى الى انخفاض الدهون الثلاثية والتي تثبط إفراز البروتينات الدهنية المعوية، وبالتالي انخفضت الدهون الثلاثية.

پەیوەندی نێوان سێوو چەشنەکانی چەوری

پوختە

ئەم لیکۆلینەوەیە کاریگەری خواردنی سێو لەسەر ئاستی چەوری لە خوێن نیشان دەدات .. دوو ڕێگەی سیستەمی خۆراکی جێبەجێ کرا دوای بە ڕۆژووبوونی ٢٠ نمونەی نێر ڕۆژانە بۆ ماوەی دوو هەفتە بۆ هەریەك لە سیستەمی خۆراکی ناوەندی کێش ئەم نموونانە ٨٥. ٣ ± کفم و ناوەندی تەمەنیان ٣٦ .٢. ٦ کە ٢ بوو ڕێگای یەکەم لە سیستەمی خۆراکی بۆ کفم بە خواردنی ٥٠ غرام (خامە) ، ١٥٥غرام لە سەموون ، فنجانێك چای ئەم ماددانەی کە بەکار هاتوون . ڕێگای دووەمی سیستەمی خۆراکی جێ بە جێ کرا بە هەمان شێوە دوای دوو هەفتە کە لە ڕێگەی یەکەم لە سیستەمی خۆراکی یەکسەر و ماوەی دوو هەفتەی خایانـد ئەمانـەی گرتـەوە بـە خواردنی سێویکی زەرد کە کێشەکەی ١٥٥ غرام و خامەکێشەکەی ٥٠ غرام و ١٥٥ غـرام سـەموون و فنجانێك چـای لە کۆتایی هەفتەی دووەمی هەر ڕێگەیەك لە سیستەمی خۆراکی خوێن وەرگیرا وەك نموونە ، لە کاتی ٠.٠ (پێش خواردن) دوای نیو کاتژمێر دوای یەك کاتژمێر و دوو کاتژمێر لە ژەمەکە Tc, LDL, HDL وخەستی -Vl Dl پێوانـە کـرا بەبـەکارهێنانی تاقیکردنـەوەی T P< 01 .0 بـۆ جیـاوازییێکی ئامـاری خەسـتی TG VLO4 بەشـێوەیەکی بەرچـاو دابـەزی (0.05>P) بەبـەراوورد لـە گـەڵ کاتـژمێری 0.0 ، کاریگـەری سـێو لـە وانەیـە هۆکارەکەی بۆ پەیوەندی بە کێشی سێو لە گەڵ فینۆلەکان هەیە لە سـێو کـە بۆتـە هۆکـاری دابـەزینی چـەوریـیە سێ یـیەکان کە دەبێتە هۆی وەستانی ڕژاندنی پڕۆتینە چەوریـیەکان لە ڕیخۆڵە لە کۆتاییدا دابـەزینی چـەوریـیە سێ یـیەکان .