Red Grapefruit Positively Influences Serum Triglyceride Level in Patients Suffering from Coronary Atherosclerosis: Studies in Vitro and in Humans

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FROM ABSTRACT

The contents of the bioactive compounds in red and blond grapefruits and their influence on humans suffering from hypertriglyceridemia were studied.

It was found that red grapefruit has a higher content of bioactive compounds and a higher antioxidant potential than blond grapefruit, determined by oxygen radical scavenging capacity.

Fifty-seven hyperlipidemic patients, ages 39-72 years, after coronary bypass surgery, recruited from the Institute's pool of volunteers, were randomly divided into three equal in number (19) groups: two experimental (red and blond groups) and one control group (CG).

During 30 consecutive days of the investigation the diets of the patients of the red and blond dietary groups were daily supplemented with one equal in weight fresh red or blond grapefruit, respectively.

Before and after this trial, serum lipid levels of all fractions and serum antioxidant activity were determined.

It was found that serum lipid levels in patients of the red and blond groups versus the CG after treatment were decreased, including reductions of total cholesterol, low-density lipoprotein cholesterol, and triglycerides.

No changes in the serum lipid levels in patients of the CG were found.

In conclusion, fresh red grapefruit contains higher quantities of bioactive compounds and has significantly higher antioxidant potential than blond grapefruit.

Diet supplemented with fresh red grapefruit positively influences serum lipid levels of all fractions, especially serum triglycerides and also serum antioxidant activity.

The addition of fresh red grapefruit to generally accepted diets could be beneficial for hyperlipidemic, especially hypertriglyceridemic, patients suffering from coronary atherosclerosis.

THESE AUTHORS ALSO NOTE:

Consumption of fruits and vegetables reduces the risk of some chronic diseases including coronary atherosclerosis.

The major bioactive compounds in fruits and vegetables are phenolics, especially flavonoids, which are responsible for their health benefits.

"The antioxidant properties of phenolics are responsible for the inhibition of oxidation of low-density lipoprotein cholesterol."

The "consumption of fruits and vegetables is inversely related to coronary atherosclerosis."

Addition of citrus juices or citrus fruits to cholesterol-containing diets leads to a hypocholesterolemic effect and to a decrease in the content of total cholesterol in the liver in experiments on laboratory animals and in hypercholesterolemic patients.

57 patients were used in this study. All of them underwent bypass surgery due to two- or three-vessel coronary artery disease (CAD). All patients were at least 12 months post surgery. All patients had hypertriglyceridemia that could not be lowered by statin drugs. No lipid-lowering and/or antioxidant-increasing drugs were used during the 30 days of the investigation.

19 subjects were randomly assigned as controls.
19 subjects randomly assigned to daily consumption of a blond grapefruit.
19 subjects randomly assigned to daily consumption of a red grapefruit.

All patients consumed a generally accepted diet for coronary atherosclerosis (66% carbohydrates, 25% protein, and 9% fat).

After 30 days and after an overnight fast, blood samples were collected. Serum total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglycerides (TG) were determined.

"A significant decrease in the level of TC and LDL-C was found in both experimental [red and blond grapefruit eating] groups."

"The decrease in the concentration of triglycerides was significant only in the patients of the red group, whose diet was supplemented with peeled red grapefruits."

The "serum antioxidant activity in patients of the red and blond groups versus CG was significantly increased."

DISCUSSION

A major risk factor of atherosclerosis is hyperlipidemia.

"It has been shown over and over again that LDL-C is the most dangerous among serum lipids and that its oxidation leads to increased penetration into arterial walls."

The association between the serum triglycerides level and coronary atherosclerosis is strong.

"The most acceptable method of treatment of this condition is a combination of a hypolipidemic agent-3-hydroxy-3-methylglutaryl CoA reductase inhibitors (statins: Crestor, Lescol, Lipitor, Simovil, Simvacor, Simvastatin, Torid)-together with proper diet. Therefore, a modified Mediterranean-type diet rich in omega-3 fatty acids efficiently potentiated the cholesterol-lowering effect of Simvastatin. However, in some patients the above-mentioned hypolipidemic drugs are not effective, especially in the cases of hypertriglyceridemia."

Supplementation of proper diets with citrus fruits or their juices could be helpful in the treatment of hyperlipidemia.

The antioxidant potential of red grapefruits is higher than that of blond grapefruits.

"The results of the investigation in humans have shown that a generally accepted antiatherosclerosis diet supplemented with fresh red or blond grapefruits positively influences the serum levels of TC and LDL-C. However, only a diet supplemented with red grapefruits was effective in significantly lowering the level of serum triglycerides."

"The results of this investigation show undoubtedly that proper diet supplemented with fresh red grapefruit significantly decreases the serum levels of lipids, especially of triglycerides."

"It has to be emphasized that treatment of these patients with statins was not effective."

"It is likely that the antioxidants in the grapefruits are responsible for the health benefits."

"We cannot exclude that only red grapefruit cultivars contain some special bioactive compounds which are responsible for the triglyceride-lowering effect."

"In conclusion, diet supplemented with fresh red grapefruit positively influences serum lipid levels, especially serum triglycerides and serum antioxidant activity."

"Addition of fresh red grapefruit to generally accepted diets may be beneficial for hyperlipidemic patients, especially those with high levels of triglycerides."

KEY POINTS FROM DAN MURPHY

1) Red grapefruits have a higher content of bioactive compounds and a higher antioxidant potential than blond grapefruits.

2) This study noted important reductions in serum lipid levels in patients consuming 1 daily red or blond grapefruit for 30 days, including reductions of total cholesterol, low-density lipoprotein cholesterol, and triglycerides.

3) However, serum triglycerides were only significantly reduced by the consumption of red (not blond) grapefruit.

4) Fresh red grapefruit contains higher quantities of bioactive compounds and has significantly higher antioxidant potential than blond grapefruit.

5) Diet supplemented with fresh red grapefruit positively influences serum lipid levels of all fractions, especially serum triglycerides and also serum antioxidant activity.

6) The addition of fresh red grapefruit to generally accepted diets could be beneficial for hyperlipidemic, especially hypertriglyceridemic, patients suffering from coronary atherosclerosis.

7) Consumption of fruits and vegetables reduces the risk of chronic diseases including coronary atherosclerosis.

8) The major bioactive compounds in fruits and vegetables are phenolics, especially flavonoids, which are responsible for their health benefits.

9) "The antioxidant properties of phenolics are responsible for the inhibition of oxidation of low-density lipoprotein cholesterol." **[Important]**

10) "The decrease in the concentration of triglycerides was significant only in the patients of the red group, whose diet was supplemented with peeled red grapefruits."

11) The "serum antioxidant activity in patients of the red and blond groups versus CG was significantly increased."

12) "It has been shown over and over again that LDL-C is the most dangerous among serum lipids and that its oxidation leads to increased penetration into arterial walls." **[The most important thing is oxidation]**

13) The antioxidant potential of red grapefruits is higher than that of blond grapefruits.

14) "The results of this investigation show undoubtedly that proper diet supplemented with fresh red grapefruit significantly decreases the serum levels of lipids, especially of triglycerides."

15) This study shows that proper diet supplemented with fresh red grapefruit significantly decreases the serum levels of lipids, especially of triglycerides, even when taking statin drugs was not effective. **[Important]**

16) "It is likely that the antioxidants in the grapefruits are responsible for the health benefits."

17) "Diet supplemented with fresh red grapefruit positively influences serum lipid levels, especially serum triglycerides and serum antioxidant activity."

18) "Addition of fresh red grapefruit to generally accepted diets may be beneficial for hyperlipidemic patients, especially those with high levels of triglycerides."